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BELL BUOY THAT RINGS UNDER ALL CONDITIONS.

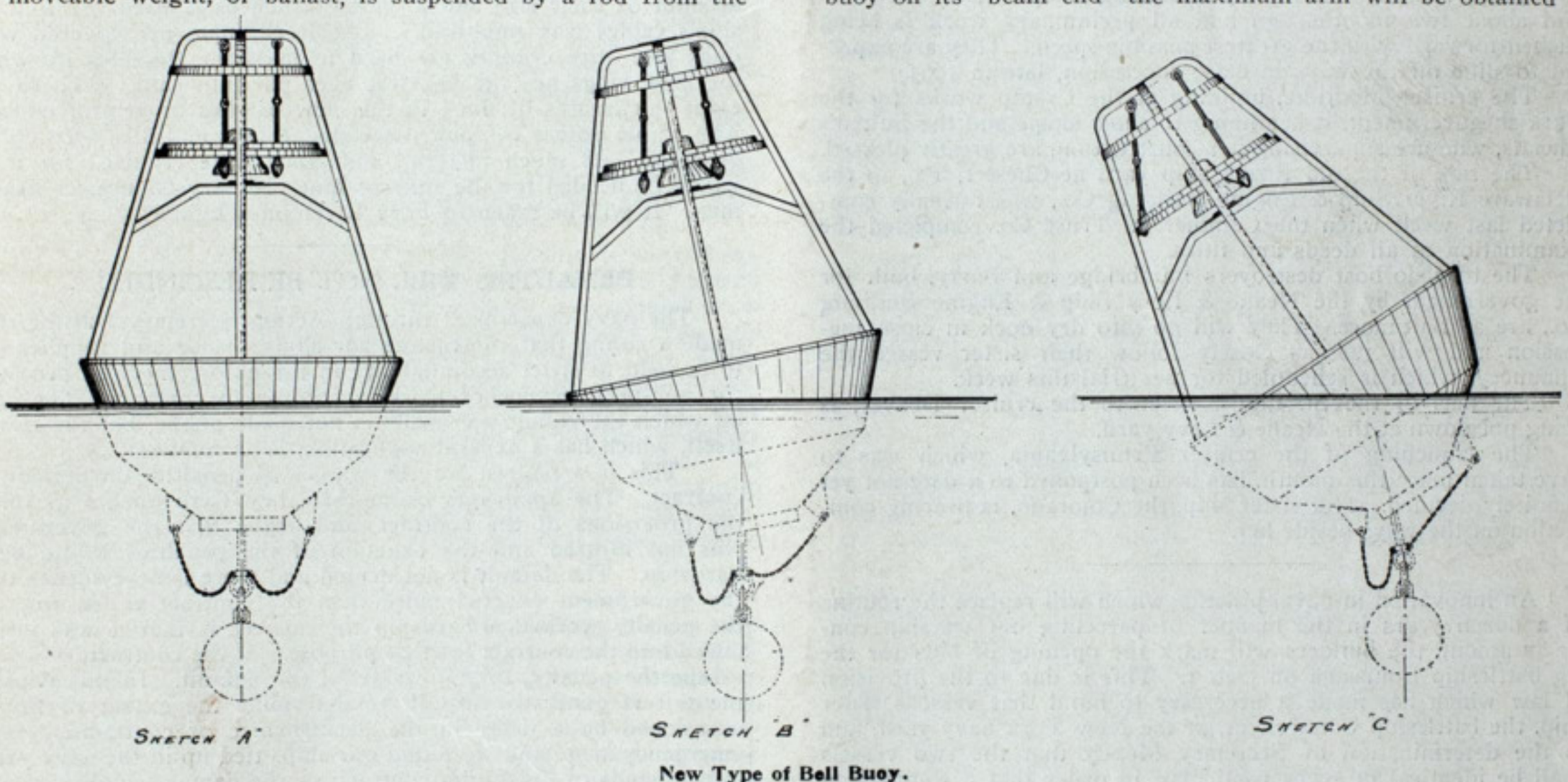
It is a well known fact that the usefulness of any buoy of the bell type lies in its ability to notify the mariner or pilot of its presence in time for him to lay his course accordingly. The buoys of this class at present in use have done their duty in this line to the best of their ability but will be forced to give place to a later and better design.

The old type will undoubtedly ring, but is sensitive to nothing less than a swell of medium size. When the weather is rough or a considerable sea is running the old buoy is more or less sufficient, but the mariner needs aid in all sorts of weather—in a calm as well as in a rough sea, and in a fog as well as in clear weather—and it is in the former cases, one of which is all-important, when this buoy fails to do the work laid out for it to do. It is a well known fact that this buoy in calm weather or in a fog rings only from the swell of a passing vessel, which of course is of no use as a guide to navigation or a help to the mariner.

The reasons for this sluggishness are to be found in the method of anchoring and ballasting the buoy and in the striking arrangement of the bell. The James Clark Co., of Baltimore, Md., have lately constructed a buoy which is thought to be a solution of this problem. To overcome the defects of the old type an improvement in the ballasting arrangement has been devised. A moveable weight, or ballast, is suspended by a rod from the center of gravity of the buoy, leaving it absolutely free to move with the slightest disturbance, whether wind, wave or the smallest ripple that is on the surface of the water. In the old type the ballast and half of the weight of the buoy prevented to a very great extent, its heeling over under some of the above conditions, thereby destroying its value as a warning to navigators. The value of this feature in the new buoy cannot be overestimated, and when taken in connection with the increased sensitiveness of the striking arrangement it renders the buoy incapable of remaining quiet.

The first buoy of the new type built was placed about seven months ago at the end of Craighill channel, at the entrance to Baltimore harbor. It has received all manner of tests in currents and under all conditions of storm, ice, etc., and is well spoken of by the shipping men of the vicinity. Masters and navigators are enthusiastic over it. It is claimed that on a moderately calm day the buoy can be heard 2½ miles without any trouble, and that even in an absolute summer calm it is easily heard three-quarters of a mile. There are no complicated parts or weak places in the design as can be seen from the accompanying sketch.

The light house inspector of the Baltimore district and the light house board of Washington were quick to see the value of this buoy to navigators and have, after thorough tests and constant watching, placed two of the kind at the ends of the Kettle Bottom, Potomac river. The arrangement of the ballast is accomplished by suspending a rod from a point about the center of gravity of the buoy, at the lower end of which is a large eye in which is hung the ball or ballast proper. To provide for a possible change in the location of the center of gravity a screw is worked on the upper rod so as to adjust the point of suspension. To enable the suspending of the ballast from the true center of gravity the buoy has a cylinder worked through its center which is open to the water. The rod previously mentioned works up and down inside of this cylinder. By means of stop-chains and eyes on the rod and on the buoy the ballast rod is prevented from striking the buoy proper. A large pad-eye on the buoy, well riveted and stiffened by a doubling plate, takes up the strain of this shock. With the weight suspended from the center of gravity and free to move about that point, it follows that with a slight degree of heel the position of the center of gravity must shift in the direction of the heel of the buoy, consequently the righting arm is not increased in proportion to the amount of heel. This gradual change in the position of the center of the weight is responsible for the sensitiveness of the buoy and its remarkable activity. The maximum righting arm is bound to be a little more than the length of the suspension rod as will be seen by referring to sketch C. It is clearly seen that with the buoy on its "beam end" the maximum arm will be obtained at a time when it is most necessary. Notwithstanding this shifting of the center of gravity the stability of the buoy is sufficient to bring it back to the original position if the action of the waves should not do so.



New Type of Bell Buoy.

Another point of advantage of this buoy in connection with the ballasting arrangement, besides its freedom to oscillate under all conditions, is the correct disposition of the weight to effect a maximum righting moment commensurate with the above feature. As will be seen by the accompanying sketches, the location of the weight in conjunction with the center of buoyancy tends to afford the best arrangement for righting the buoy under all conditions shown in the sketches.

Departing from the ballasting features a few words will suffice to describe the improvement in the striking arrangement of the bell. In the old type of buoy the striking of the bell was effected by a ball, free to move about on a corrugated plate, the corrugations concentrating at the center of the bell with the ball inside of the bell. One of the bad features of this method is that when the buoy is well heeled over, with the ball resting against the bell, the buoy is practically out of commission. Another bad point is that the marine growth, barnacles, oysters, etc., have been known to stop the ringing of the bell entirely, the corrugated plate having been completely covered with a growth of oyster shells. In the new buoy these defects are entirely rem-

edied. The method employed to do this, as may be seen by the sketch, is to suspend three clappers, outside of the bell, from a ring at the top of the framework. A Z-bar worked as a ring, lower down on the frame work, takes up the back stroke, while chains and eyes prevent the clappers from breaking away. By this arrangement the buoy cannot be heeled over, without one of the clappers at least being free to strike, no matter what the degree of heel may be. When the clappers are not striking the bell they will strike the framework and have been heard to do this for an eighth of a mile. The objections raised to the growth of barnacles, oysters, etc., are entirely eliminated by this arrangement, as no growth whatever can prevent the ringing of the bell by the clappers.

There are various localities in the country in which this buoy can be used to great advantage; harbors in which the natural features render this type very efficient. Principal among these places is the great lakes, with vast expanse of water, an immense amount of shipping and numerous harbors and connecting channels. Among other places where this buoy would aid the maritime service are the large bays and rivers of the country, such as the Chesapeake, Delaware and New York bays, the Mississippi, Missouri, Delaware, Columbia and Hudson rivers, and such inland seas as Long Island and Puget sounds.

The cheapness and simplicity of the buoy will also recommend it. There is nothing used in the construction except plates, bars and angles, worked in the simplest manner. The castings and forgings are very simple and everything is built in a way to stand the severe wear and tear necessary to this service. Such parts as are liable to damage from the natural usage they will receive are easily replaced at little cost.

SHIP BUILDING AT PHILADELPHIA.

Philadelphia, Aug. 12.—The keel for the second of the 620-ft. liners to be built for the Atlantic Transportation Co. at the works of the New York Ship Building Co., will be laid early in October, as soon as the No. 7 ways are vacated by the launching of the vessel now nearing completion there. The first of these two large steamers is rapidly assuming shape. Her keel was laid about two months ago and all preliminary work is being pushed forward with the greatest possible speed. They are expected to slide off the ways in close succession, late in 1903.

The cruiser Medjidia, building at the Cramp works for the Turkish government, is beginning to show shape and the Sultan's officials, who are supervising her construction, are greatly pleased.

The sale of the old Roach ship yard at Chester, Pa., to the Delaware River Ship & Engine Building Co., was formally completed last week when the Commercial Trust Co. completed the examination of all deeds and titles.

The torpedo boat destroyers Bainbridge and Barry, built for the government by the Neafie & Levy Ship & Engine Building Co., are at Baltimore. They will go into dry dock in close succession and will just as closely follow their sister vessel, the Chauncey, which is scheduled for her trial this week.

The keel of the St. Louis, sister to the cruiser Denver, is being put down at the Neafie & Levy yard.

The launching of the cruiser Pennsylvania, which was to have taken place this month, has been postponed to a date not yet definitely decided. Her sister ship, the Colorado, is nearing completion on the ways beside her.

An innovation in naval practice which will replace the routine of a dozen years in the manner of parceling out warship contracts among the builders will mark the opening of bids for the big battleship Louisiana on Oct. 1. This is due to the provision of law which has made it necessary to build that vessel's sister ship, the battleship Connecticut, at the New York navy yard, and to the determination of Secretary Moody that the two vessels shall be identical in every particular, in order that a comparison may be instituted between the relative merits and economies of government-built and private-contract ships. Therefore no bids will be received for alternative or modified plans, as has been customary, but contractors will be held sharply to the department's designs and specifications. It is expected that the ordinary list of bidders will be increased by bids from the Wm. R. Trigg Co., Richmond, Va., and the New York Ship Building Co., Camden, N. J.

The new gunboats authoriz d in the last naval act will follow very closely the Marietta type. The displacement will be slightly in excess of that of the Marietta, being 1,050 tons, as against 1,000 in the case of the Marietta. The speed will be 12½ knots. The batteries will be identical with those of the Marietta and Wheeling—six 4-in. guns, four 6-pounders and two 1-pounders. There will be some minor changes in the internal arrangement of boilers, but the principal change will be an additional foot of freeboard and an overhanging stem which, it is believed, will keep the ships somewhat dryer.

The United States monitor Arkansas underwent a successful trial trip last week. During the trial the Arkansas maintained a speed for two hours of 12.2 knots an hour, which exceeded requirements.

PROGRESS OF WORK AT FORE RIVER.

The keel has been laid for the first of the two car floats that are to be built by the Fore River Ship & Engine Co., Quincy, Mass., for the New York, New Haven & Hartford railroad. The blocks are laid on the beach between the cruiser Des Moines and the stocks from which the seven-masted schooner has just been launched. All of the materials for both floats are on hand now and the construction work will be pushed as fast as possible. The Oregon pine topmasts of the seven-masted schooner, Thomas W. Lawson have been stepped at the yard, and Capt. Crowley expects to begin bending her sails a week from Monday. The steering gear is all installed, the cabin is nearly finished and the other work is going forward so fast that the big fore-and-after seems likely to be ready for sea even sooner than was anticipated. The first section of concrete of the new fitting-out dock is completed and the piling for the whole structure is practically finished. The gantry crane is as nearly assembled as it can be before the track on which it will travel up and down the dock is laid. The basin will be ready to receive the cruiser Des Moines immediately after her launching, Sept. 20. The company is particularly busy at present with outside work, more of which comes to it every month, partly on account of its forge facilities. Frequent shippings of gun forgings for the United States government are being made and this week a lot of big engine forgings for the New York Ship Building Co. have been sent out.

The canvas equipment of the seven-master Thomas W. Lawson is awaiting shipment at the sail loft of E. L. Rowe & Son at Gloucester. It is certainly much the largest suit ever made for a schooner, 83,000 sq. ft. of 2/0 duck being required for it. Of this 43,000 sq. ft. are the vessel's twenty-five sails, besides which the equipment includes awnings for the forecastle and poop decks, two sails for small boats, sail covers, boat covers, etc. The duck is of the same weight as is generally used for large vessels, but is of extra quality, having been especially made by the mills from raw material selected with the greatest care. The sail ropes are the size of an ordinary schooner's cables. Three tons of manilla, bought especially for this contract, were used in making them. It was impossible to splice them by hand on account of their size and a "horse" such as is used for splicing ship's cables was employed. The leech ropes are covered with duck and wire cringles are used to keep the thimbles in, while the clew rings are the heaviest ever put into sails. There are eight thicknesses of duck in the clew patches or reinforcements. The whole canvas equipment weighs 18 tons and fills 3,700 cu. ft. of space. As much material and labor were required for it as would be needed for the suits of nine ordinary Gloucester fishermen. It will be taken to Fore River on a lighter.

PENALTIES WILL NOT BE RESCINDED.

The navy department through Acting Secretary Darling, has made a ruling that contractors for ships' armor and supplies are to be held to strict accountability in the enforcement of penalties for non-performance of work, according to contract. The case on which the ruling was made is not made public, but the ruling itself, which has a general application, is as follows:

"This is a request for the waiver of penalties on default of contract. The applicants claim that they were unable to fulfill the provisions of the contract, and argue that the government was not injured and the exaction of the penalties would be a hardship. The default is not denied and there is no evidence that the government exacted more than the contract called for. If the penalty worked a hardship the answer is that it was introduced into the contract for that purpose. If the contractors would escape the penalty, they must avoid the default. In this department it is generally difficult to determine the extent of injury occasioned by a delay in the performance of contracts. If an emergency arose and we found our ships tied up in the navy yard, in the hands of defaulting contractors, the damage might be inestimable. Nor are such damages to be measured in dollars and cents alone. The moral effect is not to be overlooked. The indifference with which contractors make and break contracts, and then apply to the department for relief, has become dangerous. If the policy of enforcing these penalties were strictly adhered to it might at first work hardships to a few individual contractors, but the navy department is not a charitable institution, and in the end I believe it would be found salutary to the contractors and to the advantage of the service. I recommend that the penalties be enforced."

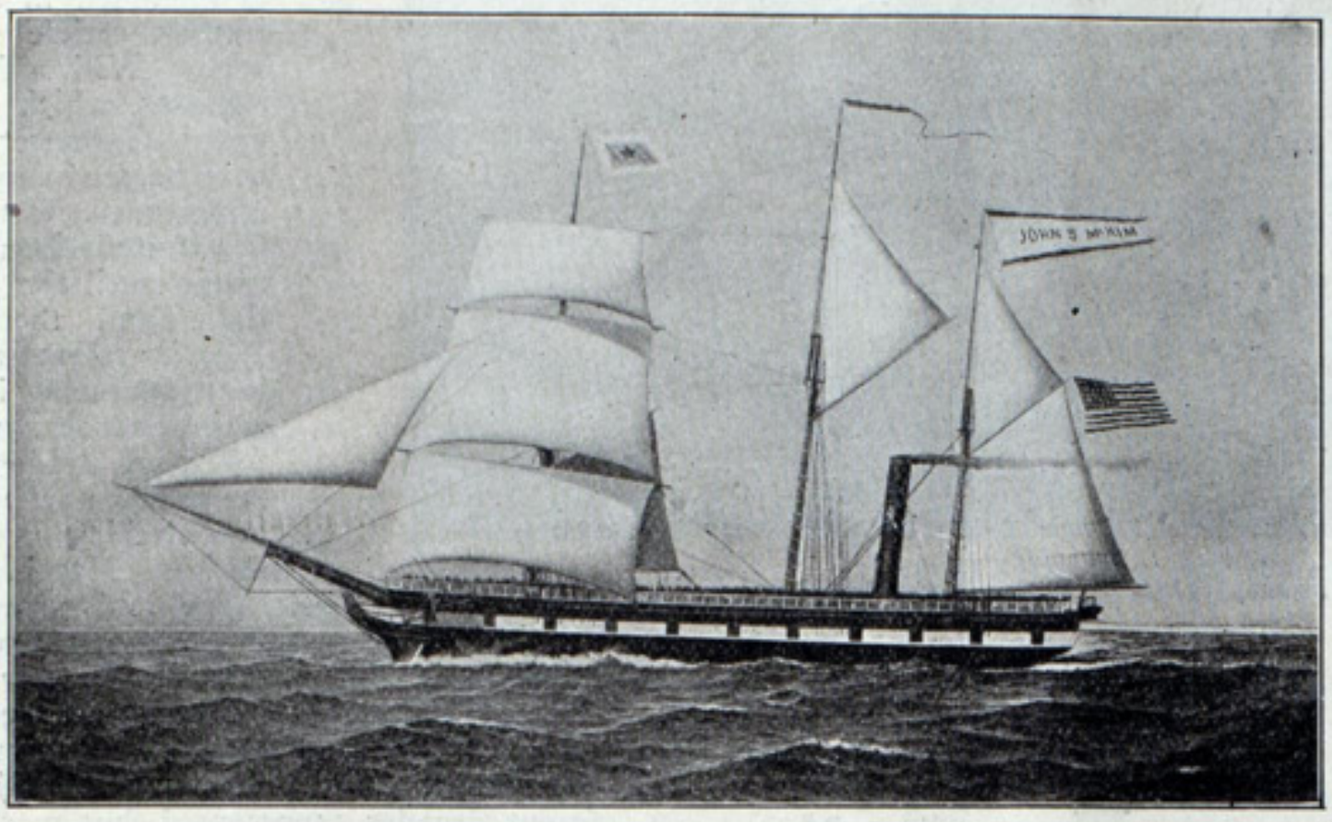
Secretary Moody's indorsement of Mr. Darling's ruling approves it and makes it the rule of the navy department.

According to the experts of the Hamburg-American and North German Lloyd lines the Deutschland, of the Hamburg-American line, still holds the record for the fastest transatlantic trip. The experts of both companies signed a memorandum to this effect last week, stating that the calculation of Capt. Richter, of the Kronprinz Wilhelm, from which it appeared that the latter had beaten the Deutschland's time, was erroneous.

The piles on which the foundation for the cradle of the new $4,212,000 battleship Connecticut is to be built at the Brooklyn navy yard, are now being driven.

ATLANTIC COASTWISE STEAMERS REVIEWED BY DECADES.

BY RAY MORRIS.



John S. McKim. Clyde's, 1844.

A detailed history of the American coastwise shipping during the fifty years or so of its existence, would require a large volume. Furthermore, it may perhaps be said that its value would not compensate its length, since it would be concerned with an infinite number of complications, the effect of which would be to confuse the reader, and obscure the actual lines of progress and change. The purpose of this article is to show graphically the *tendencies* of traffic and of design in the history of American coastwise steamers on the Atlantic. Every tenth year has been singled out to illustrate, briefly and in a general way, the tendencies of the decade, and the month of March has been arbitrarily chosen as the unit, within the year, for purposes of consideration. Since ordinarily, the life of a ship considerably exceeds any one ten year period, the changes which occur in a given decade indicate the increasing and changing needs of the traffic, rather than merely the replacement of worn out hulls with new ones.

It is difficult, in many cases, to draw the line between deep-water and inland boats. Ferguson & Wood's little New Bedford boats, which ran in 1872, would, for example, be excluded from present-day lists as not conforming to the deep-water type, and the fine side-wheel steamers of the Boston & Bangor line, which not only have an outside run, but can stand rough treatment, are excluded for this reason. Standards of construction have changed so greatly, however, that it was considered necessary to include the New Bedford boats in the tables for 1872. In order to get the subject within the space limitations, it has also been necessary to exclude what are known as the "'off-shore" boats, to Havana, Panama, etc., except for occasional mention for purposes of reference.

1842.

In March, 1842, there were no steamers making regular outside runs on the Atlantic coast. During the month, the R. M. S. Clyde arrived at New York from Halifax, and proceeded to Charleston, Nassau, Savannah and Havana, but this was an isolated trip, and the Clyde was the only deep-water steamer which entered New York harbor during that period, although the Cunard line, between Liverpool and Boston, was advertising its inaugural runs. The lists of vessels arriving and clearing at New York in 1852, however, ten years later, show, besides the steam transatlantic mail routes, a well-organized coastwise service, with eight lines in regular operation, as is indicated in the table. The illustration of the John S. McKim will serve as a general type for the forties.

1852.

During March, 1852, the second period chosen, the great rush to California following the discoveries of gold was at its height. Exclusive of sailing vessels, there were ten lines of steamers which ran down the coast and continued to the Isthmus, making connections across either at Chagres or at San Juan de Nicaragua. Similar lines on the Pacific side conveyed the passengers and freight to San Francisco. In some cases, however, the ships rounded the Cape and succeeded, in spite of the great length of the journey, in filling their cabins at each departure. Commodore Vanderbilt undertook the last of his sea ventures at this time. Exclusive of his interest in the Pacific Mail line, there were two lines of steamers which bore his name, one of which ran a single ship to Chagres, and the other, of which D B. Allen was agent, cleared during the month three ships for San Juan de Nicaragua. Fifteen steamers cleared during this month with San Francisco traffic, the most favored Isthmus port on the Atlantic side being Chagres. The famous Pacific Mail line, which is in operation at the present day, first appeared in this decade—Roberts, agent—with the steamers Crescent City, Empire City, El Dorado and Georgia, for March clearances. As a rule, these ships touched at Havana, New Orleans, or both, and hence linked themselves to the coastwise service proper. It is rather curious to note that they were advertised under two heads; as "United States Mail S. S. Co." boats for New Orelans, and as "Pacific Mail" boats for Chagres, one and the same ship performing both of these functions. They were representatives of the highest type of coastwise design of their day, and cleared with their cabins crowded with passengers, who paid $315 for transport to San Francisco, the prevailing rate via clipper ship varying from $200 to $250. They were all paddle steamers, and the Georgia, which was the largest, was of 2,727 tons, built in 1849 by Smith & Durion, New York. The Philadelphia was of 1,238 tons and the Empire City of 1,751 tons.

There were two lines which cleared ships for Charleston in March, 1852. Spofford & Tiletson first appear in this decade, operating the steamers Union, Marion, James Adger and Southerner. The Adger was a propeller; the others were side-wheel, and the Union, 1,200 tons, built in 1850 by Wm. H. Webb, New York, was the largest. The Adger was also built by Webb in '52, and was of 1,151 tons burthen. She did not clear during March, however. Wardle's South Carolina line also cleared the steamer South Carolina for Charleston once during the period chosen. The South Carolina was a paddle boat of 1,304 tons, built in New York the year previous by Jabez Williams. The Marion of Spofford & Tiletson's line measured 900 tons, and the Southerner 960 tons.

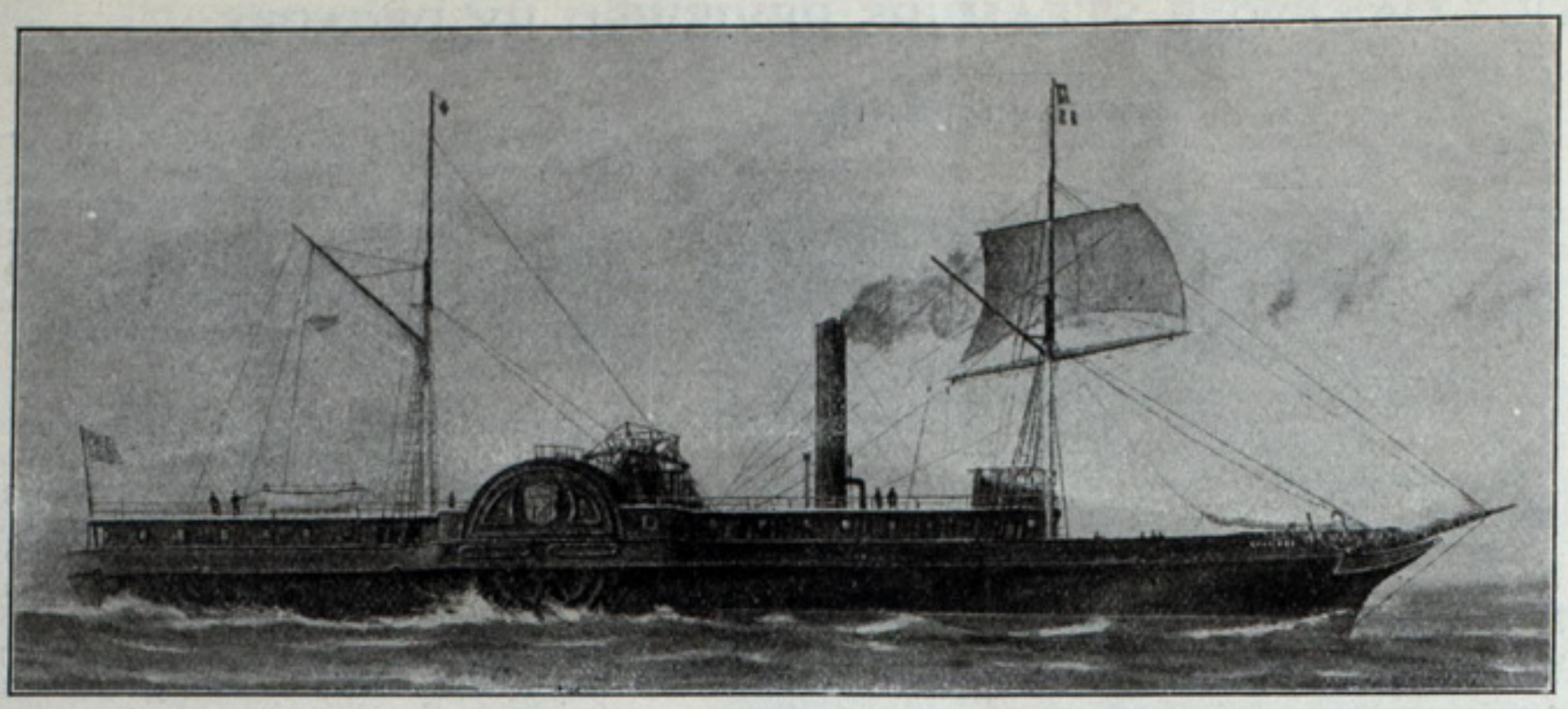
There were also two steam lines to Norfolk. Mailler & Lord, who operated other lines from New York to Boston and Philadelphia cleared two small propellers, the City of Norfolk and the City of Richmond, of 572 and 444 tons, respectively. The New York & Virginia Steamship Co., also operated the first steamer Roanoke, 1,071 tons, illustrated as typical of the period. The Roanoke was built at Westervelt's yard, New York, in 1851, and frequently made the run from Norfolk in twenty-three hours; but little slower than its successors on the Old Dominion line in the eighties.

There were three steam lines to Philadelphia at this period; Thompson's Mailler & Lord's and Sandford's Independent line. The latter cleared the Delaware and the Kennebec, 616 and 480 tons, respectively, and was the most important; the others operating single ships, which ran irregularly. Mailler & Lord's Boston line, with the steamer Ontario, concludes the list of coasters of 1852 which made New York a port. Tonnage and other particulars of the Ontario are not, unfortunately, available at this time. The table to the left of this column deals fully with the matters referred to in preceding paragraphs.

March, 1852.

	Steamers Cleared from New York.	Type.	Gross Tons.	Total gross tons cleared during March.	No. of departures from New York.
NEW YORK AND BOSTON:					
Mailler & Lord's Line	Ontario†				
NEW YORK AND PHILADELPHIA: (Outside).					
Independent Line.	Kennebec	Wood, p. w.	480	2,328	4
	Delaware	(*)	616		
NEW YORK AND NORFOLK:					
New York & Virginia S. S. Co.	Roanoke	Wood, p. w.	1,071	5,355	5
Mailler & Lord's Line	City of Norfolk	(*)	572	2,032	4
	City of Richmond	Wood, scw.	444		
NEW YORK AND CHARLESTON:					
Spofford-Tiletson's Line	Union	Wood, p. w.	1,200	8,280	8
	Marion	Wood, p. w.	900		
	Southerner	Wood, p. w.	960		
Wardle's Line	South Carolina	Wood, p. w.	1,304	1,304	1
NEW YORK AND SAVANNAH:					
Mitchell's Line	Alabama	Wood, p. w.	1,051	4,550	5
	Florida	Wood, p. w.	816		
NEW YORK & NEW ORLEANS:					
U. S. Mail S. S. Co. to New Orleans, via Havana	Empire City	Wood, p. w.	1,751	5,716	3
	Georgia.	Wood, p. w.	2,727		
	Philadelphia	Wood, p. w.	1,238		

†Did not clear during March. *No records.



Roanoke, 1851. N. Y. and Virginia S S. Co. 1,071 Tons.

March, 1872.

	Steamers cleared from New York	Type	Gross tons.	Total gross tons cleared during March	No of departures from New York
NEW YORK AND PORTLAND: Maine S. S. Co.	Franconia	Wood, scw.	674	3,510	6
	Chesapeake	Wood, scw.	496		
NEW YORK AND NEW BEDFORD: Ferguson & Wood	Wamsutta	Wood, scw.	328	978	3
	Acushnet	Wood, scw.	325		
NEW YORK AND SALEM: Murray & Ferris	Norwich	Wood, scw.	367	1,193	3
	Alliance	Iron, scw.	413		
NEW YORK AND BOSTON: Metropolitan	Glaucus	Wood, scw.	1,849	22,185	12
	Nereus	Wood, scw.	1,849		
	Neptune	Wood, scw.	1,848		
Mallory	Tillie	Wood, scw.	418	418	1
NEW YORK AND PHILADELPHIA Lorillard's	Benefactor	Iron, scw.	844	6,684	10
	Fanita	Iron, scw.	432		
	Volunteer	Iron, scw.	611		
NEW YORK AND WASHINGTON-ALEXANDRIA: Merchant's Line	E. C. Knight	Wood, scw.	421	1,309	3
	John Gibson	Wood, scw.	444		
NEW YORK & NEWBERN, N. C.: Murray & Ferris	Zodiac	Wood, scw.	606	1,920	4
	Ellen S. Terry	Iron, scw.	354		
NEW YORK AND NORFOLK: Old Dominion Line	Wyanoke	Iron, p.w.	2,067	17,004	12
	Isaac Bell	Wood, p.w.	1,612		
	Albemarle	Wood, p.w.	871		
Virginia S. S. Co	Wm. P. Clyde	Wood, scw.	504	3,833	7
	G. B. Upton	Wood, scw.	607		
NEW YORK AND WILMINGTON: Wilmington & Charlotte S. S. Co.. Lunt's Line	Francis Wright	Wood, scw.	597	597	1
	Metropolis	Wood, scw.	879	879	1
Lorillard's Line	Regulator	Iron, scw.	847	2,126	3
	Fanita	Iron, scw.	432		
NEW YORK AND CHARLESTON: Morgan Line	Georgia	Iron, p.w.	1,900	19,204	13
	South Carolina	Iron, p.w.	1,650		
	Champion	Iron, p.w.	1,452		
	Manhattan	Wood, p.w.	1,338		
	Charleston	Wood, p.w.	1,227		
	James Adger	Wood, p.w.	1,085		
NEW YORK AND SAVANNAH: Murray & Ferris	Leo	Wood, scw.	924	17,481	17
	Virgo	Wood, scw.	1,143		
Livingston & Fox	General Barnes	Wood, scw.	1,295		
	Herman Livingston	Wood, p.w.	943		
Lowden	Montgomery	Wood, scw.	1,100		
	Huntsville	Wood, scw.	825		
Garrison	Magnolia	Wood, p.w.	1,068		
	San Salvador	Wood, p.w.	971		
NEW YORK AND BRUNSWICK AND FERNANDINA: Hand's Line	Mercedita	Wood, scw.	856	3,234	4
	Ashland	Wood, scw.	761		
NEW YORK AND NEW ORLEANS: Cromwell Line	Cortes	Wood, scw.	1,246	4,276	4
	St. Louis	Iron, scw.	1,062		
	Geo. Washington	Wood, scw.	989		
	Geo. Cromwell	Wood, scw.	979		
Merchant's Line (Baker)	Western Metropolis	Wood, p.w.	2,092	6,127	5
	United States	Wood, scw.	1,180		
	General Meade	Iron, scw.	1,103		
	Sherman	Iron, scw.	973		
	Emily B. Souder	Wood, scw.	779		
Southern Line (Mallory)	City of Galveston	Wood, scw.	1,253	4,315	4
	Equator	Wood, scw.	1,044		
	Victor	Wood, scw.	1,327		
	Gen'l Sedgwick	Wood, scw.	691		
NEW YORK AND GALVESTON: Texas Line	City of Houston	Iron, scw.	1,253	4,122	4
	Clyde	Iron, scw.	1,182		
	Wilmington	Iron, scw.	895		
	Ariadne	Wood, scw.	792		

It is interesting to note that the different coastwise lines on the Atlantic which have not made New York their port, may be safely excluded in compiling an article of this sort. With a few exceptions, which will be noted hereafter, they have been of very slight importance, from the first foundations of the traffic until the present time, and the New York steamers have been foremost in size, speed and design. The following table shows the names of the steamers clearing coastwise during March, 1852, together with their type and gross tons, and the total gross tonnage cleared and number of departures from New York during the month are also included. It will be seen that no attempt is made to compare the entire fleets during the different decades represented, but merely the ships which cleared in the single month. The table shows that the United States Mail Steamship Co. operated the largest ships of the decade which ran from New York to another American port on the Atlantic, and, in fact, the Georgia, 2,727 tons, was larger than some of the smaller coasting steamers of the present day.

1862.

During the month of March, 1862, taken to complete the chronological order of the periods, the coastwise service was practically non-existent, owing to the blockading of the southern ports and the employment of the steamers in government service. There were no lines at all, in fact, which cleared steamers to the southern ports, although the Pacific Mail, Allen's Aspinwall, and Ludlow & Heineken's Havana lines continued running. Cromwell's line from New York to Portland was also in operation during this period, with the steamer Chesapeake, and there were small steamers between New York and Boston, Philadelphia, Providence, Trenton and Baltimore. But the practical suspension of all coasting business is shown by the fact that there were five arrivals and six clearances during the month, and of the seven steamers represented, all except the Chesapeake cleared for Panama, Aspinwall or Havana. The Boston & Philadelphia Steamship Co. was, however, in operation at this period, with the Saxon, and therefore the Chesapeake and the Saxon must stand as the sole representatives of the period chosen. The Chesapeake was a wooden propeller of 496 tons, built at Philadelphia in 1863. and was subsequently bought by Cromwell's Portland agents, and operated by them, after he had withdrawn his service. The Saxon, which is still running between Philadelphia and Providence, and was launched early in '62, was of 1,293 tons; a very fine boat for the period.

Several of the accompanying illustrations, however, show the general progress of coastwise marine architecture in the sixties. The Morro Castle, one of the best boats on the coast, ran to Havana and elsewhere on Spofford, Tiletson & Co.'s line. She was a paddle steamer of 1,680 tons, built at New York in 1864, with an oak hull. The Bienville, of Livingston & Fox's line, was a wooden vessel of 1,468 tons, built at Williamsburgh, in 1860. The Quaker City ran during the latter sixties on the regular line to Charleston, Leavy, agent. She had previously been engaged in off-shore service and was built in 1854.

The 1872 decade is of unusual interest because of the number of lines engaged, and because of the activity of the competi-

tion and the high freight and ensuing profit. The prevailing boats were small, but there were twenty-three coast-wise lines out of New York, exclusive of a large number of services by smaller, not of the deep-water type. The small steamers from Philadelphia, for example, going by way of the canals averaged four or five in number each day. Of the deep-sea boats, 117 cleared coastwise during March. In a word, this was the closing decade when it was profitable to run small steamers and to compete with the railroads for passenger and mail traffic. A comparison with 1882 shows that at that time there were fourteen lines only, and 109 clearances, but in 1872 the railroad connections were not particularly good, and railroad time was not particularly fast. The ports were the centers of industry, and fine ships were driven to their best performance with large passenger and mail traffic, besides remunerative freight. The accompanying table shows the lines of the period.

A casual survey of the figures shows that the paddle and screw steamers were equally common, with a prevailing tonnage of 1,500 or less, and 10 or 12 knots as the maximum speed. The majority of the hulls were built of wood at shipyards scattered throughout the New England states, as well as at New York, Philadelphia and Wilmington. The screw steamers were equipped almost universally with a single, direct-acting engine, and, as a rule with one boiler. It was a period of competition rather than of consolidation, and a period when the traffic was profitable in spite of wasteful engines and small hulls.

1882

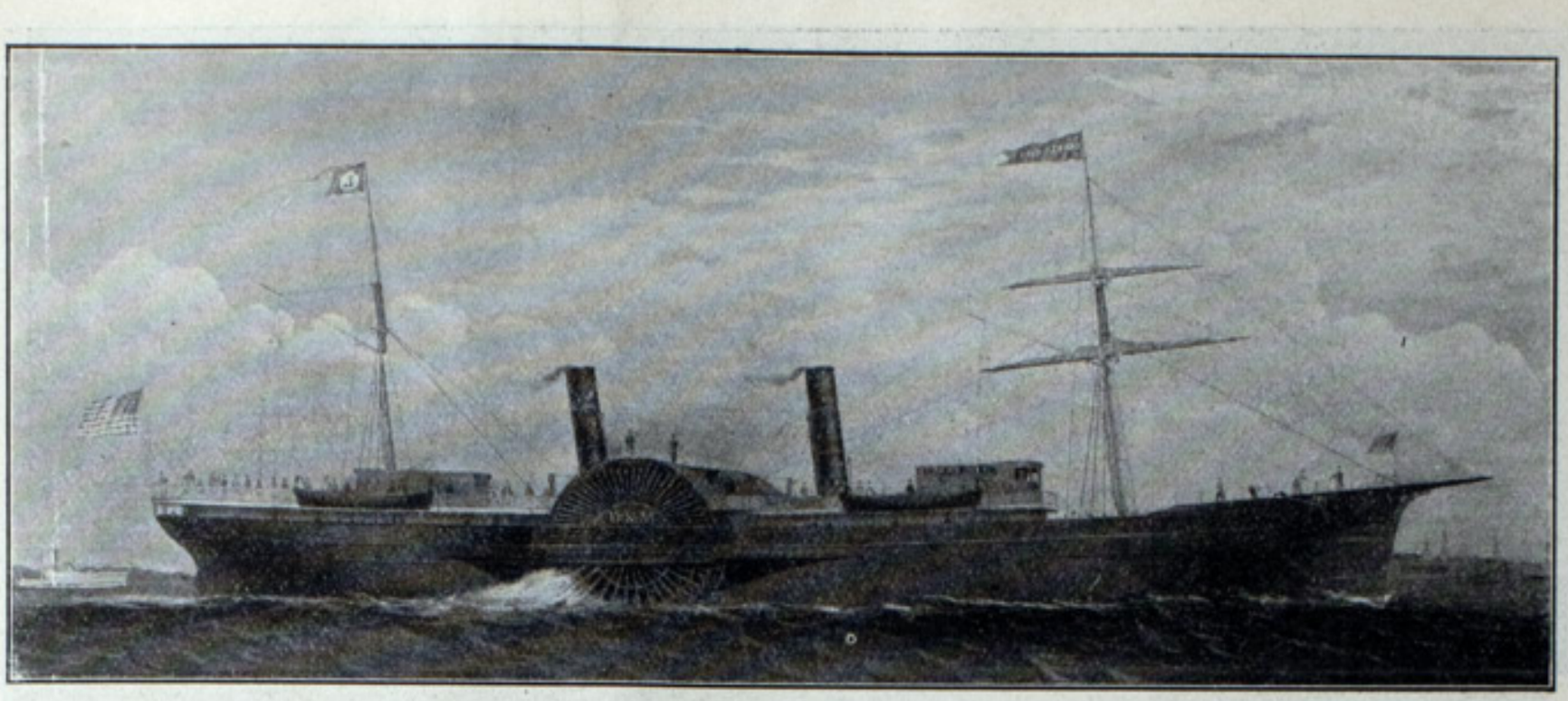
The next decade shows radical changes in type, management, and the general nature of the service, and of competition. The year 1882 and the general period of the nearly eighties followed times when there had been great railroad expansion and considerable business depression. The whole conditions of the service had changed since the decade previous. The mails were now carried by land; freights were low, and the coasting steamers carried passengers who traveled by sea rather on account of special reasons, such as lower rate of passage, etc., than because it was the quickest and most feasible method of transportation. To make traffic pay under these conditions, it became necessary to reduce ton-mile cost by increasing carrying capacity and by getting the maximum efficiency out of the coal burned. Hence the prevailing coastwise type was the boat of increased size, with an iron hull, propeller and compound engines. Roach, the Cramps, and Harlan & Hollingsworth built practically every steamer on the coast at this time, in consequence of which the general types were very similar.

The following table of the number of ships and number of lines which cleared them, in each decade period, shows quite clearly the change in the early eighties, by the fact that the gross tonnage cleared during the month was nearly 40,000 tons more than in March, 1872, in spite of the fact that eight fewer ships cleared, and the figures showing the number of lines in operation point out the fact that it was no longer profitable to maintain more or less haphazard services without due regard for all possible economy, in the face of the competition. The results of this decade in the coasting traffic seem almost to have anticipated the present demand for greater cargoes and fewer carriers in the transatlantic service.

Coastwise Steamship Traffic Out of New York.

Month of March:	No. of clearances.	No. of lines.	Total gross tons cleared from New York.
1842	1	..	.....
1852	30	8	29,565
1862	1	1	496
1872	117	23	120,747
1882	109	14	168,664
1892	118	12	285;741
1902	148	14	414,537

It is perhaps well to remark in connection with the figures shown that there is no known way of obtaining absolute tonnage or statistics throughout the different periods considered. Lloyd's Register has been followed as far back as practicable, but fifteen years ago it was the exception rather than the rule to find the rating of an American coasting vessel in Lloyd's. Hence before that, the American Record, corresponding in general to Lloyd's, was followed, but the American Record was founded in 1868, and for the years before that the only available figures were those deposited with the United States commissioner of navigation as each ship was built. These were kindly furnished by the present commissioner, and are undoubtedly very accurate, but it is obvious that there are likely to be slight differences in methods of measuring gross tonnage. The figures may safely be considered close, however, and are certainly as close as can be obtained. The table which follows shows the approximate location of the trade in 1882.



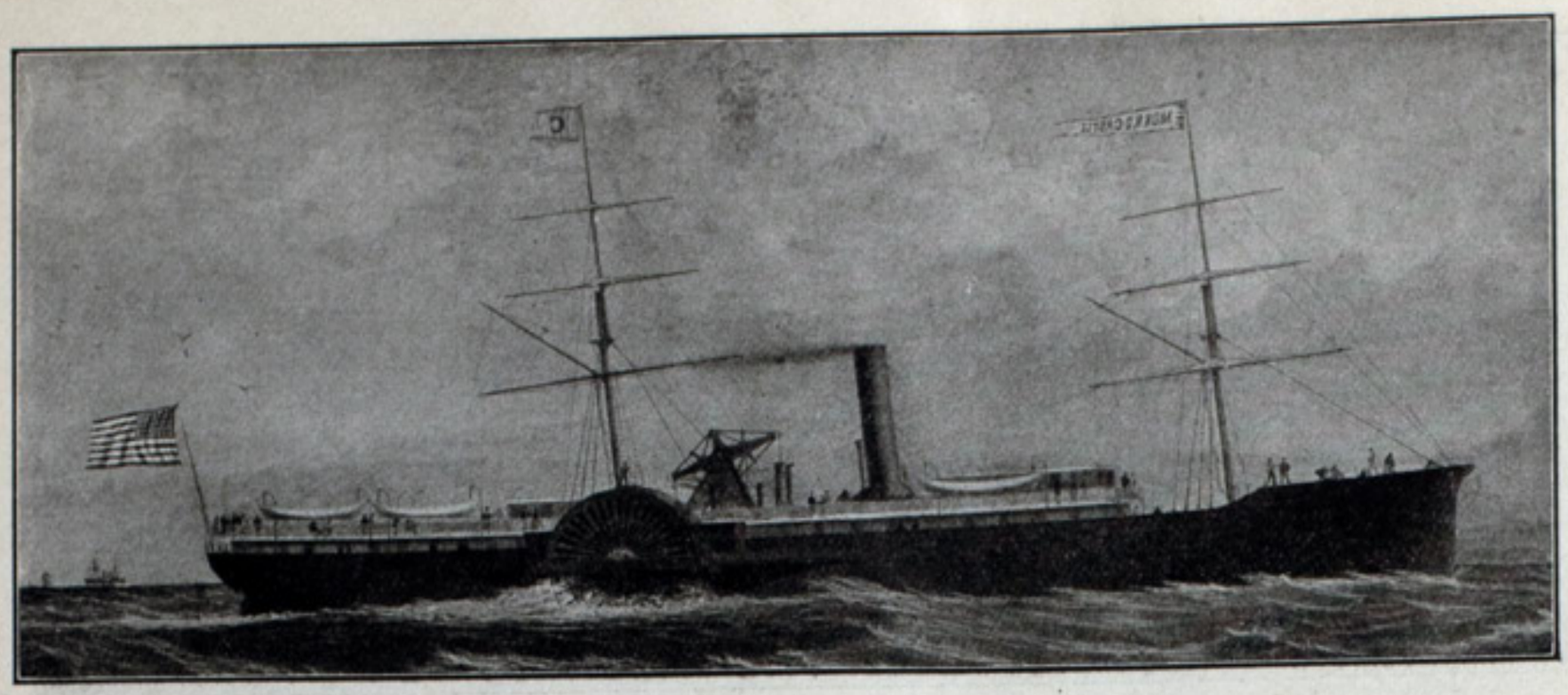
Quaker City, 1854. Off-Shore Service. 1,143 Tons.

As will be seen from the table, the best boat running coastwise in 1882 was the Chalmette, of the Morgan line. The Chalmette, an iron screw steamer of 3,205 tons, was built by the Cramps in 1879. She is 321 ft. long, and fully as large as the majority of the best boats which were running a decade later.

1892.

The next decade, illustrated by March, 1892, shows increased size, the practical disappearance of wooden hulls, prevalence of compound engines, and a gradual working in of steel. The Roach yard at Chester, now the Delaware River Ship & Engine Building

March, 1882. Steamers cleared from New York	Type	Gross tons.	Total gross tons cleared.	Number of departures from New York.
NEW YORK & PORTLAND, ME.:				
Maine S. S. Co. — Eleanora	Wood, scw.	988	7,640	9
Maine S. S. Co. — Franconia	Wood, scw.	675		
NEW YORK AND BOSTON:				
Metropolitan Line — Neptune	Wood, scw.	1,848	24,032	13
Metropolitan Line — Glaucus	Wood, scw.	1,849		
Metropolitan Line — Gen. Whitney	Wood, scw.	1,849		
NEW YORK AND BALTIMORE:				
Merchant's & Miners' Transportation Co. — Wm. Kennedy	Wood, scw.	975	9,084	9
Merchant's & Miners' Transportation Co. — McClellan	Wood, scw.	983		
Merchant's & Miners' Transportation Co. — Blackstone	Wood, scw.	1,147		
NEW YORK AND GEORGETOWN D. C.:				
Clyde Line — E. C. Knight	Wood, scw.	421	1,730	4
Clyde Line — John Gibson	Wood, scw.	444		
NEW YORK AND NORFOLK:				
Old Dominion — Richmond	Iron, scw.	1,438	40,728	26
Old Dominion — Manhattan	Iron, scw.	1,525		
Old Dominion — Breakwater	Iron, scw.	1,045		
Old Dominion — Wyanoke	Iron, p.w.	2,067		
Old Dominion — Old Dominion	Iron, p.w.	2,223		
NEW YORK & WILMINGTON, N.C.:				
Clyde — Benefactor	Iron, scw.	844	6,376	7
Clyde — Regulator	Iron, scw.	847		
Clyde — Gulf Stream	Iron, scw.	998		
NEW YORK AND CHARLESTON:				
Quintard's Line — City of Atlanta	Wood, scw.	1,621	20,290	12
Quintard's Line — City of Columbia	Wood, scw.	1,878		
Quintard's Line — Santo Domingo	Wood, scw.	1,642		
Quintard's Line — Morro Castle	Wood, scw.	1,714		
Quintard's Line — Delaware	Wood, scw.	1,646		
NEW YORK AND SAVANNAH:				
Ocean S. S. Co. — City of Macon	Iron, scw.	2,093	19,060	9
Ocean S. S. Co. — City of Columbus	Iron, scw.	1,992		
Ocean S. S. Co. — City of Augusta	Iron, scw.	2,870		
Ocean S. S. Co. — City of Savannah	Iron, scw.	2,029		
Ocean S. S. Co. — Gate City	Iron, scw.	1,997		
NEW YORK AND NEW ORLEANS:				
Cromwell Line — Louisiana	Iron, scw.	2,849	7,541	4
Cromwell Line — Hudson	Iron, scw.	1,564		
Cromwell Line — New Orleans	Iron, scw.	1,564		
Morgan Line — Algiers	Iron, scw.	2,294	10,383	4
Morgan Line — Chalmette	Iron, scw.	3,205		
Morgan Line — New York	Iron, scw.	2,590		
NEW YORK AND GALVESTON:				
Mallory Line — San Marcos	Iron, scw.	2,839	10,999	4
Mallory Line — Rio Grande	Iron, scw.	2,556		
Mallory Line — Colorado	Iron, scw.	2,765		
NEW YORK AND PORT ROYAL-FERNANDINA:				
Mallory Line — City of San Antonio	Iron, scw.	1,605	9,795	6
Mallory Line — State of Texas	Iron, scw.	1,736		
Mallory Line — Carondelet	Wood, scw.	1,508		
NEW YORK AND JACKSONVILLE:				
Warren Ray — Louis Bucki	Wood, scw.	417	417	1
Van Brunt — John E. Stevens*	.....	.....	.....	1



Morro Castle, 1864. Off-Shore Service. 1,680 Tons.

March, 1892.

Steamers cleared from New York	Type	Gross tons.	Total gross tons cleared.	No. of Departures from New York.
NEW YORK & PORTLAND, ME.:				
Maine S. S. Co. — Manhattan	Wood, scw.	1,892	16,096	9
Cottage City	Wood, scw.	1,885		
Eleanora	Wood, scw.	988		
NEW YORK AND BOSTON:				
Metropolitan Line — Herman Winter	Iron, scw.	2,626	34,462	13
H. F. Dimock	Iron. scw.	2,626		
H. M. Whitney	Iron, scw.	2,707		
NEW YORK AND NORFOLK:				
Old Dominion — Seneca	Iron, scw.	2,729	62,507	31
Roanoke	Iron, scw.	2,354		
Guyandotte	Iron, scw.	2,351		
City of Atlanta	Wood, scw.	1,336		
Wyanoke	Iron, p.w.	2,067		
Old Dominion	Iron, p.w.	2,223		
Richmond	Iron, scw.	1,438		
NEW YORK & WILMINGTON, N. C., AND GEORGETOWN, S. C.:				
Clyde Line — Pawnee	Wood, scw.	1,210	3,444	3
Croatan	Steel, scw.	1,024		
NEW YORK AND CHARLESTON:				
Clyde — Algonquin	Iron, scw.	2,833	36,433	14
Iroquois	Iron, scw.	2,944		
Cherokee	Iron, scw.	2,557		
Seminole	Iron, scw.	2,557		
Yemassee	Wood, scw.	1,880		
NEW YORK AND SAVANNAH:				
Ocean S. S. Co. — Kansas City	Iron, scw.	3,679	49,878	17
City of Birmingham	Iron, scw.	3,066		
City of Augusta.	Iron, scw.	2,870		
Chattahoochee	Iron, scw.	2,676		
Nacoochee	Iron, scw.	2,680		
Tallahassee	Iron. scw.	2,677		
NEW YORK AND BRUNSWICK:				
Mallory Line — Rio Grande	Iron, scw.	2,556	8,584	4
State of Texas	Iron, scw.	1,756		
NEW YORK AND FERNANDINA-ST. AUGUSTINE:				
Warren Ray — City of St. Augustine	Wood, scw.	564	564	1
NEW YORK AND JACKSONVILLE:				
Merchants' S. S. Co., of Florida, Somerville, Agt. — J. G. Christopher	Wood, scw.	1,039	2,078	2
NEW YORK AND NEW ORLEANS:				
Cromwell Line — Louisiana	Iron, scw.	2,849	9,105	5
Hudson	Iron, scw.	1,564		
Knickerbocker	Iron, scw.	1,564		
New Orleans	Iron, scw.	1,564		
El Paso	Iron, scw.	3,531		
Morgan Line — El Mar	Iron, scw.	3,531	35,432	10
El Dorado	Iron, scw.	3,531		
El Sol	Iron, scw.	4,572		
Excelsior	Iron, scw.	3,264		
Chalmette	Iron, scw.	3,205		
NEW YORK AND GALVESTON:				
Mallory Line — Concho	Iron, scw.	3,724	27,722	9
Alamo	Iron, scw.	2,943		
Comal	Iron, scw.	2,935		
Nueces	Iron, scw.	3,367		
Colorado	Iron, scw.	2,765		
San Marcas	Iron, scw.	2,839		

Niagara, 1877. Off-Shore Service. 2,265 Tons.

Co., was building the majority of ships for the coasting trade at this time, and the first boat built by them with compound engines, specifically intended for the Atlantic deep-water coastwise trade, was the Rio Grande, in 1876. Harlan & Hollingsworth's first compound engines for the coast were in the Decatur H. Miller, built in 1879 for the Merchants & Miners Transportation Co. The Cramps put compound engines in the Geo. W. Clyde as early as 1871, and these were the first built in this country. But in spite of the fact that these instances all date back to the decade previous, the compound type of engine was not universally found until the close of the eighties, so that it may be fairly included in the list of important advances in construction typified by the decade ending in 1892. The change in size to permit of increased carrying capacity, is clearly shown by the following table, carried to date:

Average Gross Tonnage of Three Largest Ships.

New York to	1852.	1862.	1872.
Savannah	....	....	1,179
Charleston	1,218	....	1,667
Norfolk	696	....	1,517
New Orleans	1,905†	....	1,530
Portland	....	496*	704
Boston	....	....	1,849
Av'ge of six ports.	1,273		1,408
New York to	1882.	1892.	1902.
Savannah	2,330	3,205	4,650‡
Charleston	1,745	2,778	3,400
Norfolk	1,938	2,478	3,111
New Orleans	2,881	3,531	4,757
Portland	831§	1,888§	3,123§
Boston	1,849	2,653	2,680
Av'ge of six ports.	1,929	2,755	3,620

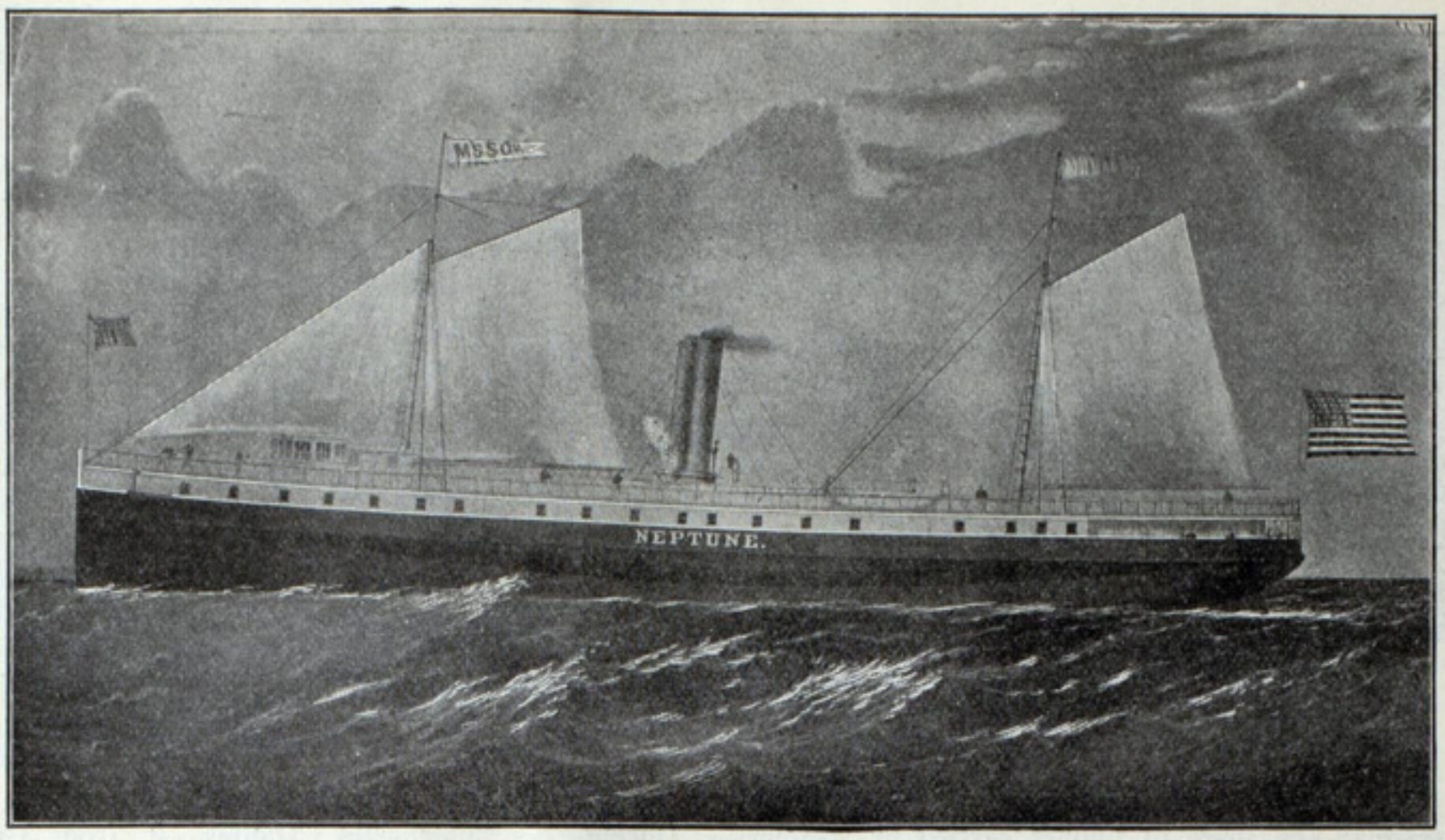
*Steamer Chesapeake; no others running. †These boats touched at New Orleans and continued to off-shore ports. §Two ships only. ‡Including City of Memphis, not in commission during March.

The table following, in uniform form with that of the other decades, shows the tonnage clearances in 1892. The Morgan line to New Orleans, mentioned as having the largest ship (the Chalmette) in 1882, is seen to have the best equipped fleet, with the Savannah line second. This is coincident with another change in the service; control by railroads. The last ship built independently by Mr. Morgan was the Excelsior, 1882. The Southern Pacific railroad then became interested in the line, and subsequently leased the property, building all the ships whose names begin with "El." Similarly, the Central of Georgia acquired the securities of the Ocean Steamship Co., of Savannah, better known as the "Savannah Line."

The first triple expansion engines built in the United States for a large vessel in the merchant service were put in the Iroquois, Clyde line, in 1886. Hence mention of them is proper in connection with this decade, but, like compound engines ten years earlier, they were only found in a few of the best boats, in 1892, and are by no means universal at the present time, al-

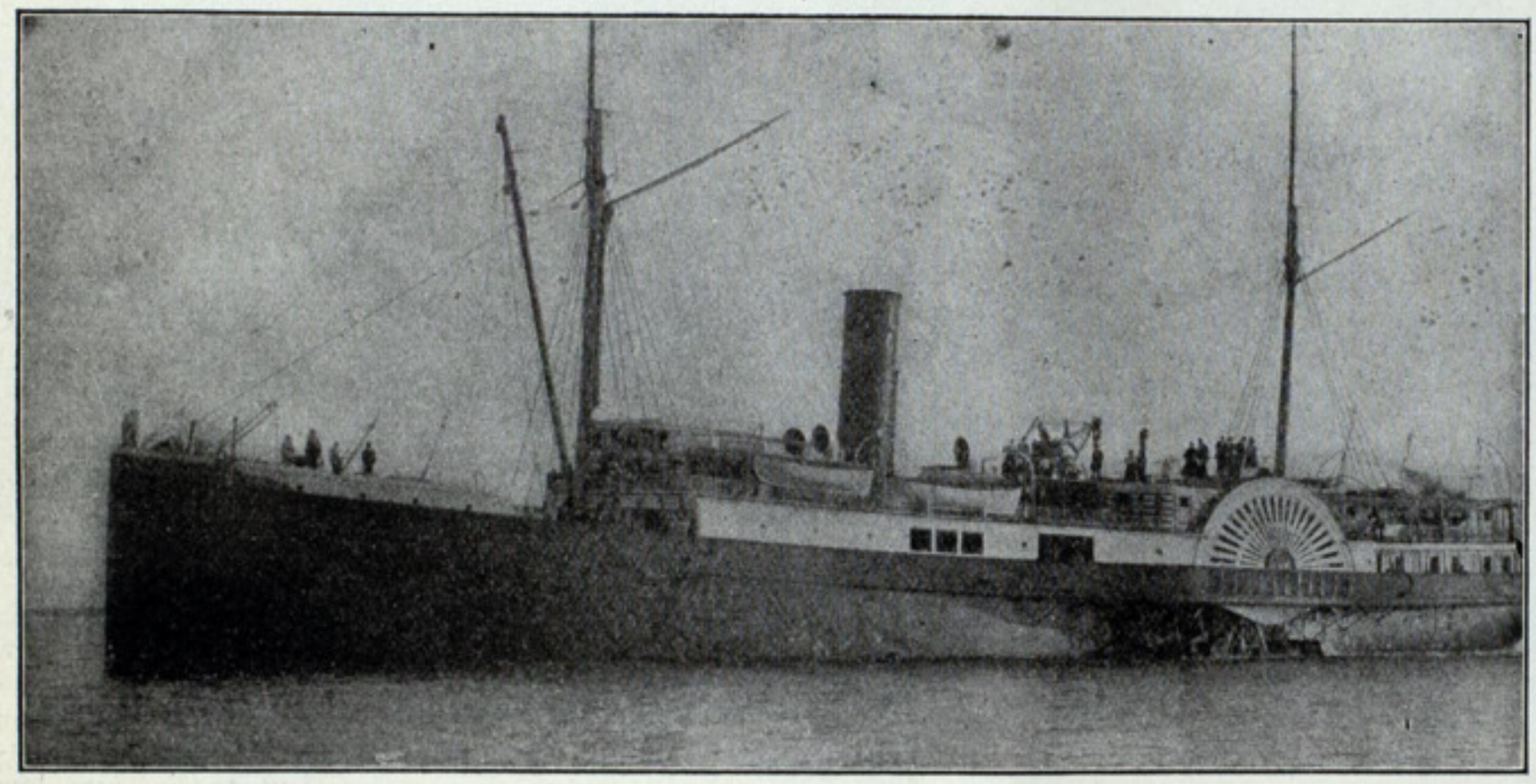
though it is fair to reckon them as a standard type of high class construction.

At the present time, the tendency to increase size and carrying capacity is marked. Speed and passenger traffic are considerations which have been, in general, steadily decreasing in importance since the days when there was active competition along these lines, but there are important exceptions to this statement. The Morgan boats, for example, carry freight from New Orleans to New York in five days, which is not much different from freight train time, and the Maine Steamship Co. advertises widely its fast passenger service to Portland, through the Sound, and secures a large passenger traffic in the warm months. Similarly, the Old Dominion line has a good all-the-year business to Norfolk, though the boats are not as fast as would be feasible under modern conditions, because the "rush" traffic must of necessity go by rail, and the steamship company would not be recompensed by enough increased trade, in case a faster service were maintained, to pay for the extra coal. In fact, the general traffic of the coasting lines to-day is not unlike that of the Atlantic Transport, or Leyland lines to England. Freight which is bulky and need not be rushed is the main consideration; the passenger business is secondary but very profitable in the busy season. What might be called the "economic"" speed on the coast is from 12 to 14 knots; a trifle less than that of the better transatlantic boats which handle he same general traffic.

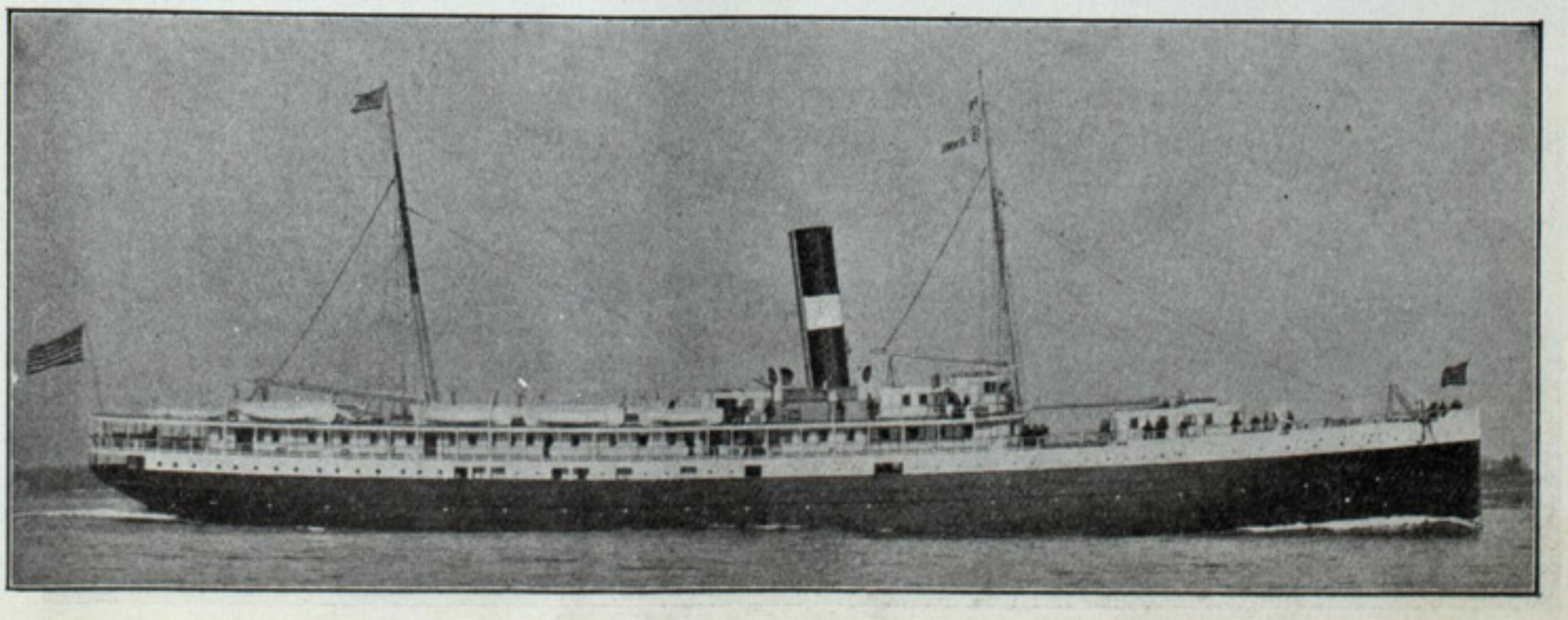


Neptune, 1864. Metropolitan Line. 1,848 Tons.

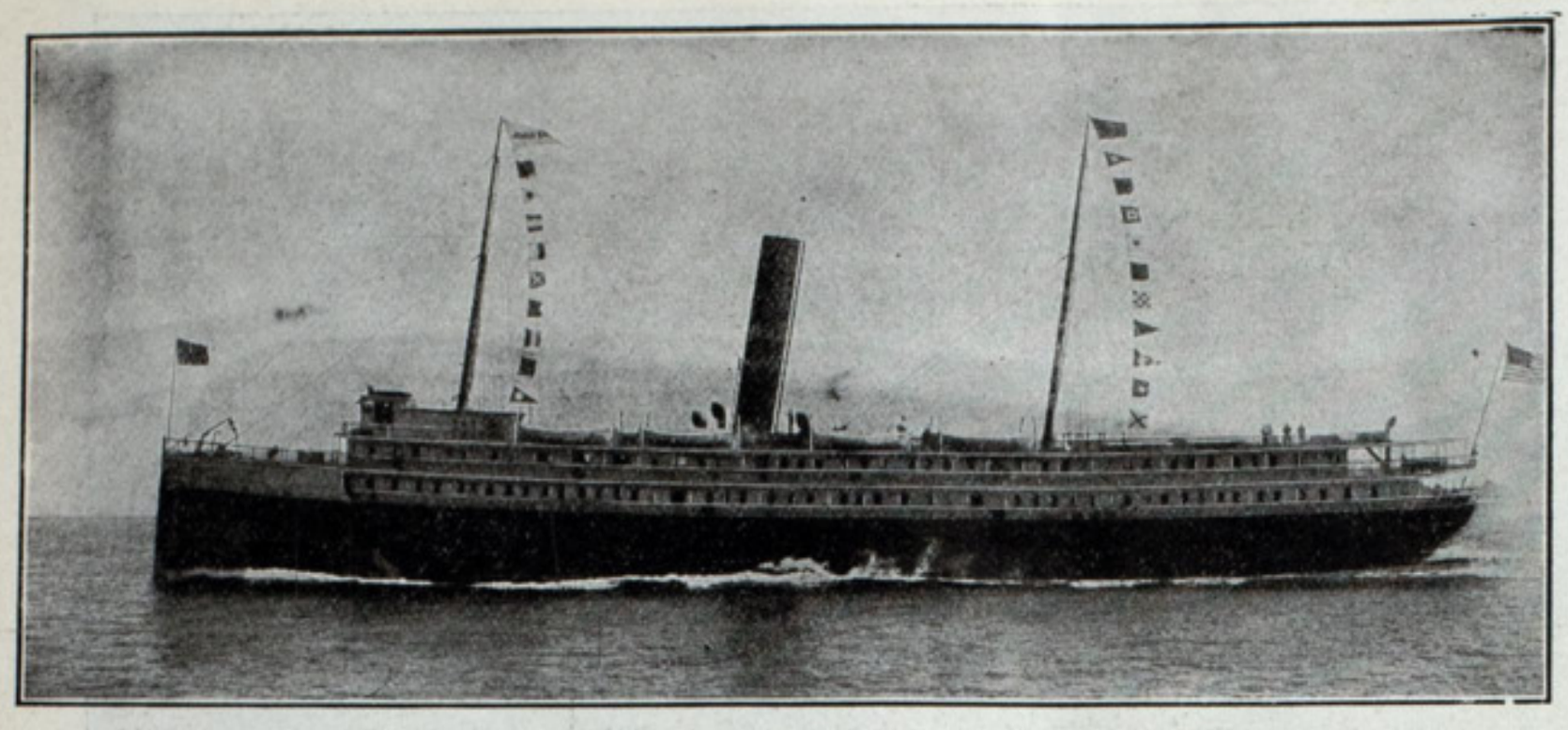
The slow transatlantic boats of great carrying capacity have two competitors; the express steamers, and charter boats or "tramps," which hover about from port to port wherever there is prospect of business. Sailing vessels are no longer in transatlantic trade. On the coast the conditions are somewhat analogous, but less favorable for the steamers. First and foremost, the railroads are in the field for every kind of traffic, and rates must be low, indeed, to secure even freight of bulkiest and least profitable character. Next in order, and corresponding in a certain way to the competition of the "tramps," come the schooners. The fleet engaged in the coal and lumber business is enormous, and the boats can go up the rivers to semi-inland ports such as Beaufort, S. C., and secure their cargoes almost from the mills direct without the necessity of previous shipment to a steam port. With the increase in carrying capacity of the steamers, however, schooner charters have been becoming scarcer and their competitive rates lower, year by year, until now the trade is only really profitable under exceptional conditions. Cheap charters are better than none, however, and the effect of the schooner competition is, in a considerable degree, to take the lumber trade away from the steamers, except at two or three ports, such as Savannah and Georgetown, S. C. During April, 1902, the Brunswick Board of Trade reported to 9,485,200 superficial feet of lumber, and 7,253,300 superficial feet of railroad ties shipped coastwise on sailing vessels, a total of 20,633,650, as against 3,895,150 ft. by steamer. No lumber at all was shipped north from Brunswick by rail, since whatever goes that way is sent direct from the mill where it was manufactured. The rates vary greatly and it is impossible to summarize them further than to say that, in general, steamers average about $1.00 per 1,000 ft. more than sailing vessels. It will be noted that Brunswick is reached by a weekly service of the Mallory line.



Old Dominion, 1872. Old Dominion and Joy Lines, 2,223 Tons.



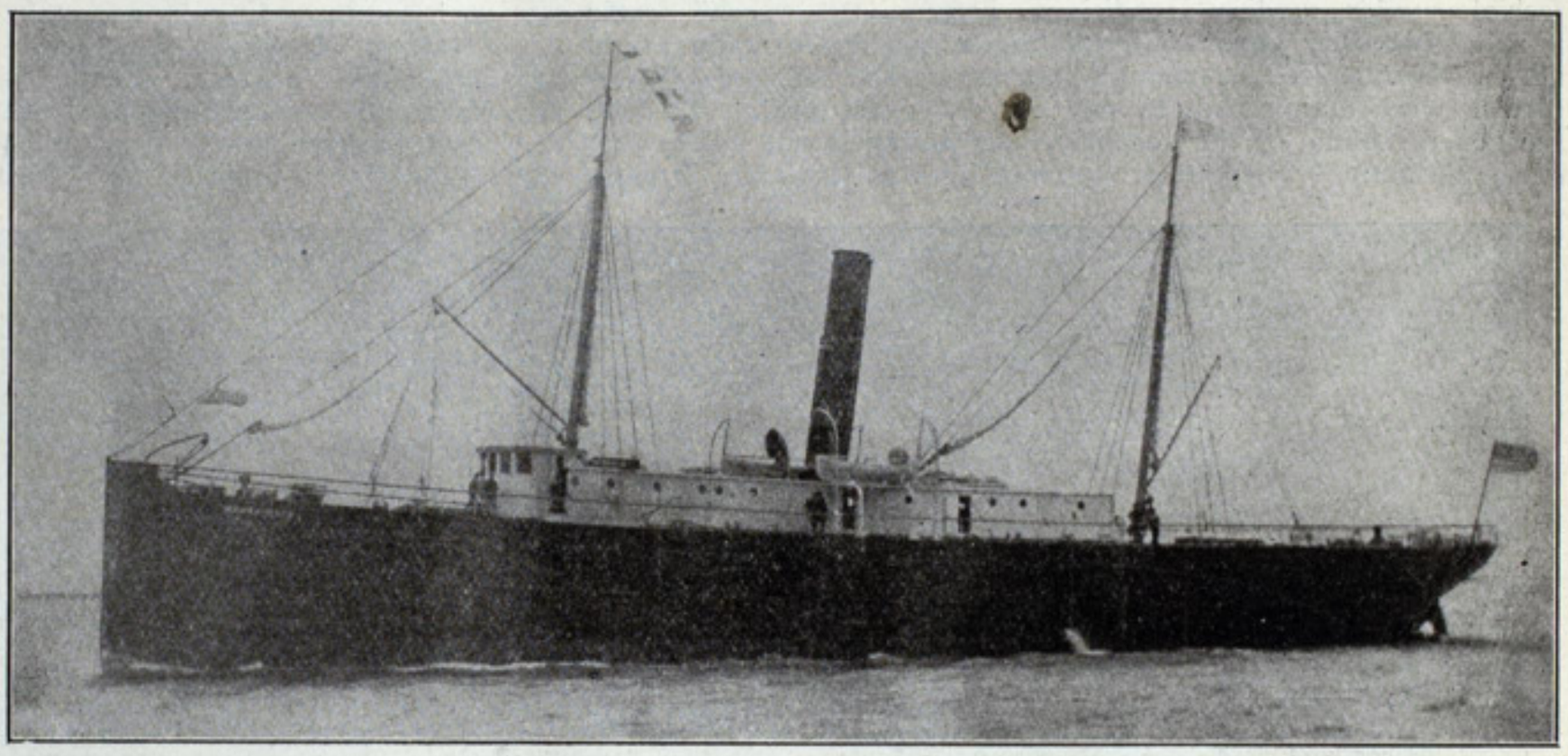
Princess Anne, 1897 Old Dominion Line. 3,079 Tons.



John Englis and Horatio Hall, 1898. Maine S. S. Co. 3,168 Tons.

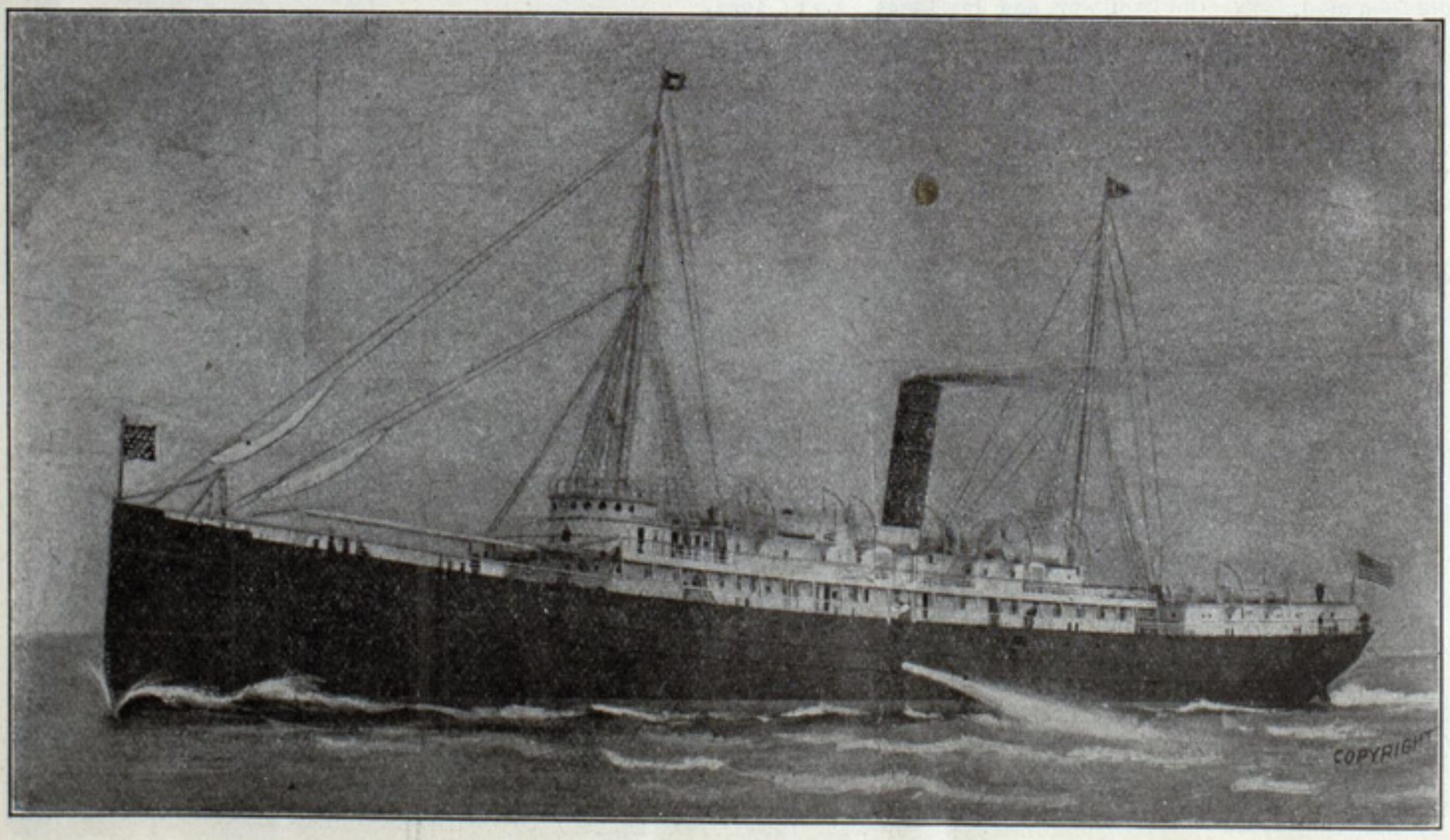
Savannah is a great steam port, and the figures show a large increase in the share of lumber carried by steamers. During 1901, 178,000,000 ft. of lumber were shipped from the port. Of this total, 167,000,000 ft. went coastwise. The sharing of the coastwise portion between steam and sail cannot be obtained from the port statistics, but out of the 178,000,000 total, 98,000,000 went by sail and 80,000,000 by steam. It is the small ports all along the coast from Cape Hatteras south, however, which swell the schooner lumber tonnage.

The coal traffic is handled by a different means yet, exclusive of that which comes by rail. Although the schooners depend much on coal charters, a great amount of the traffic is handled in barges, towed in strings of four or five from the railroad terminus at Norfolk or elsewhere to their destination, and brought back light. This is a kind of transportation which, in its scope, seems to be peculiarly American. The British coaster is a collier, par excellence, but the American coaster goes through twenty years of service without transporting a ton of coal, except within the bunkers. The development of the towing industry as a factor in commercial development is too a large a subject to be discussed here but it is sufficient to say that it is an out-growth of recent years; that ton-mile cost is reduced astonishingly, and that it is another source of confusion to the sorely perplexed schooner owner.



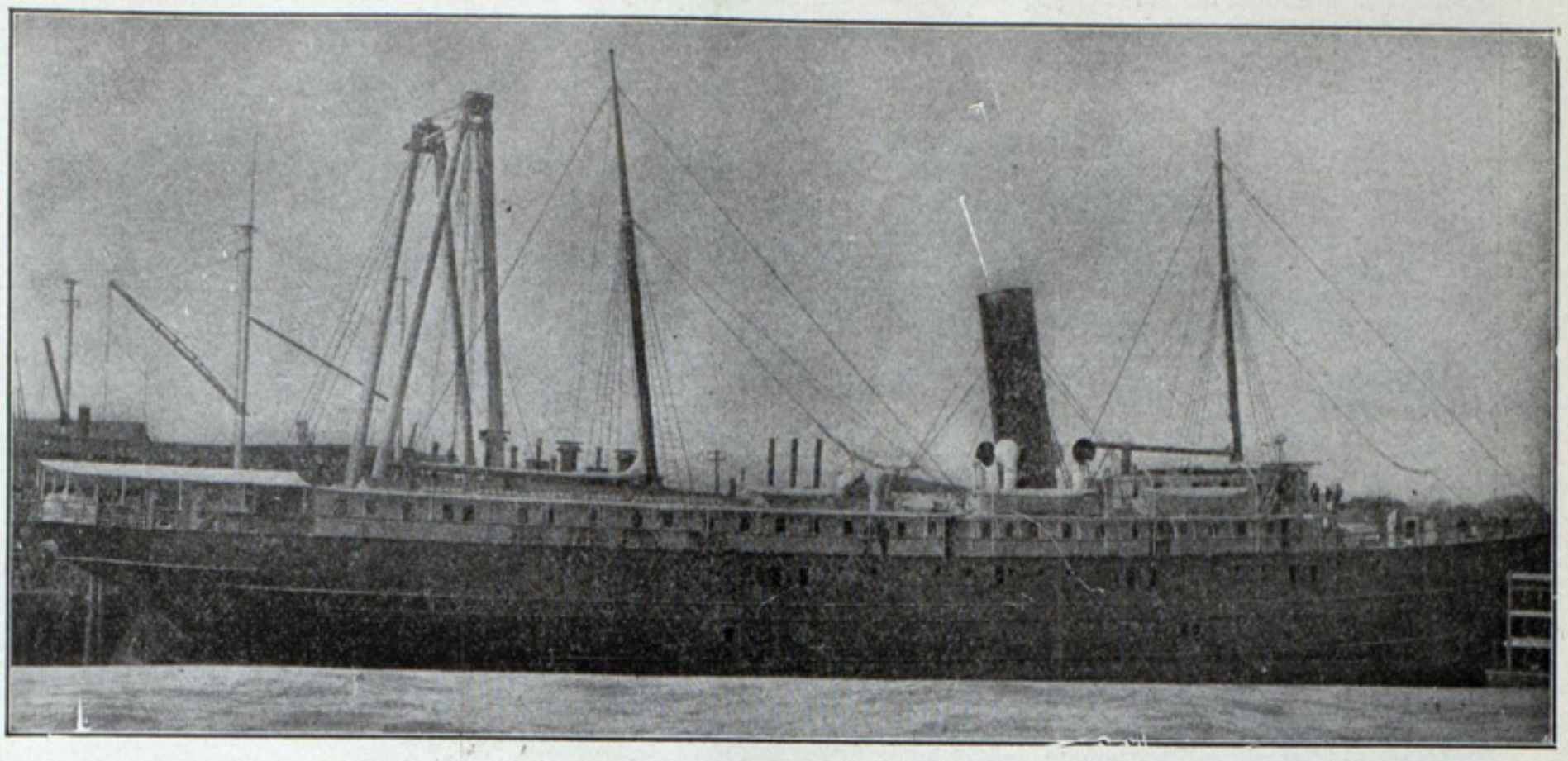
Manna Hata, 1900. N. Y. and Baltimore Trans. Co. 1,103 Tons.

Space does not permit of a comparison between British and American coastwise service, although it would be of great interest in this connection. Suffice it to say that the characteristic British coaster is a boat of 1,000 tons or less, which carries anything, from coal to railroad iron, at a speed for about eight knots, and "tramps" it from Greenock to Birkenhead, and from the Thames to the Tyne. Many if not most of the boats are designed with their engines aft, to permit of a single long cargo hold, for railroad iron, etc., instead of two short ones, and with cellular framing so that no particular harm will be done if it is found convenient to lie over low tide on a mud bank, in a tidal harbor.



Comus, 1899. Cromwell Line. 4,828 Tons.

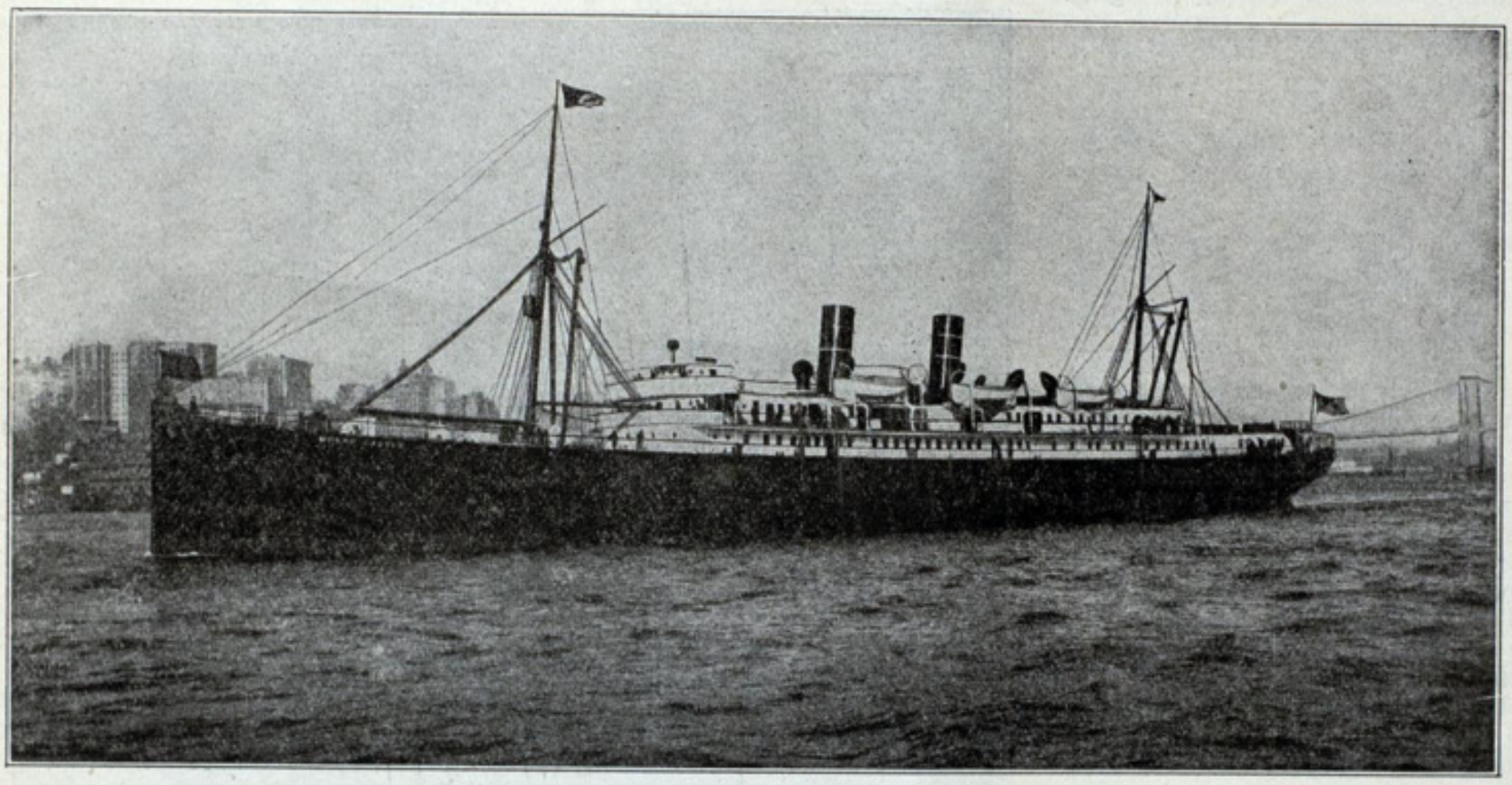
Of the new boats in the American coastwise service, the City of Memphis, the North Star and the Comus are interesting as types, showing three different tendencies of the present day. The City of Memphis is the nearest analogy to the big, slow transatlantic boats. At the time she was ordered, there was a split in the company, one faction standing for a freighter, pure and simple, and the other for a fast passenger boat. The result was a compromise, in the Memphis, a freighter of large carrying capacity with accommodations on a



Kershaw, 1899. Merchants and Miners Transportation Co. 2,600 Tons.

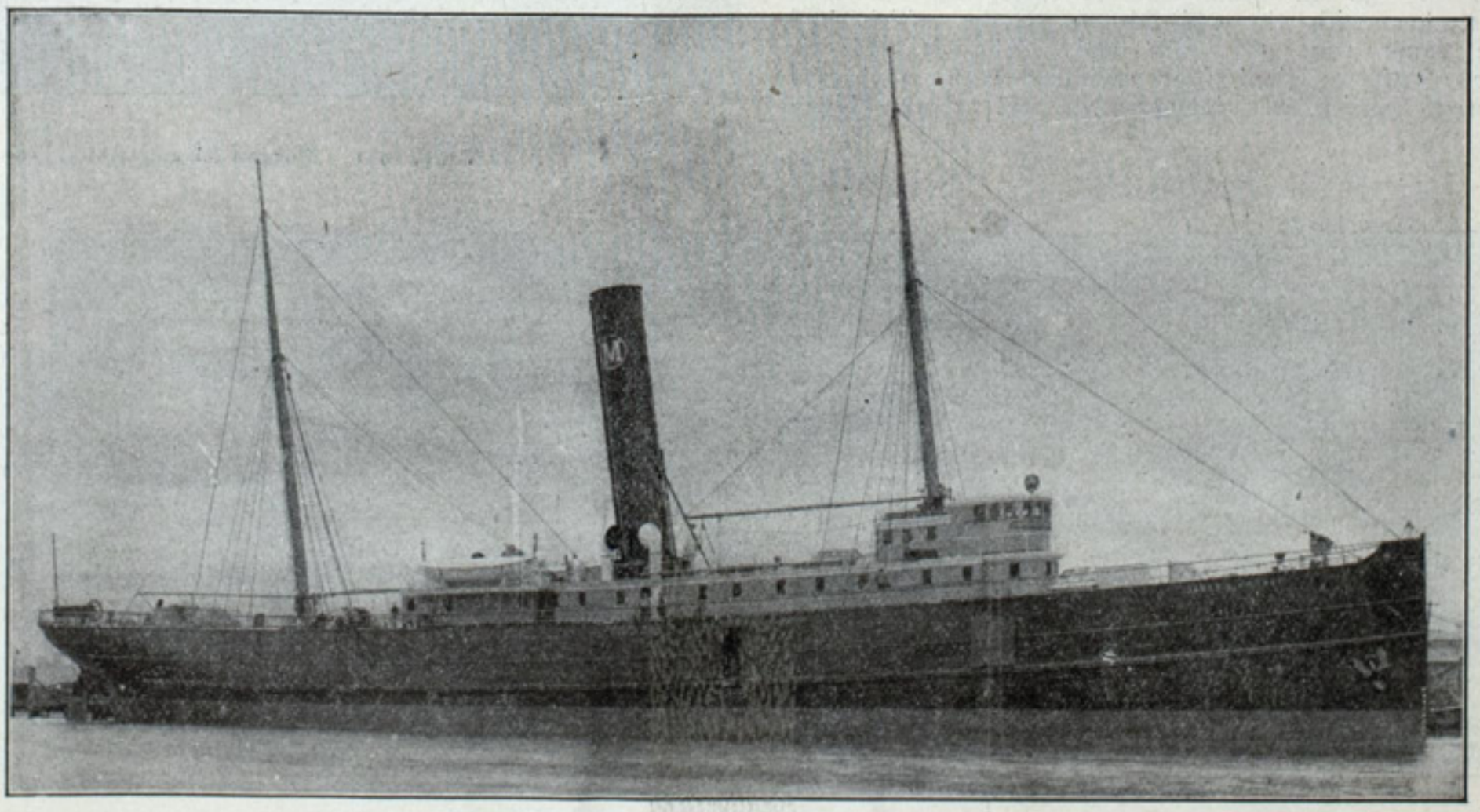
single deck for a limited number of passengers. She was completed this spring at the Roach ship yard, Chester, Pa., and is a single screy steamer of 5,252 gross tons; length, 396 ft.; width, 49 ft. beam. It is interesting to observe in the illustration that not only is there no sheer visible, but the decks appear to hog. As a matter of fact, there is a sheer, of a trifle over 30 in., but the eye is so accustomed to seeing more that an illusion is produced. The Comus designed by Horace See, and built at the New Port News works, exaggerates the sheer as much as the Memphis belittles it. She represents the type of moderately fast passenger and freight service under railroad management, exemplified also in the Savannah line and in the splendid ships (freight only) of the Morgan line, between New York and New Orleans. The new Morgan boats also designed by Mr. See, and the Comus and Proteus, of the Cromwell line, are much alike, except that the Cromwell boats have an extra deck for passengers. Their working speed is about 15 knots.

The North Star is primarily a passenger carrier in the warmer months, although there is plenty of room for all the freight that can be obtained. It is perhaps safe to say that she and her sister ship, the Horatio, Hall, maintain the fastest working speed of any-deep water boats on the American Coast; approximately 16 knots. The North Star was built last year at the Roach Ship Yard.

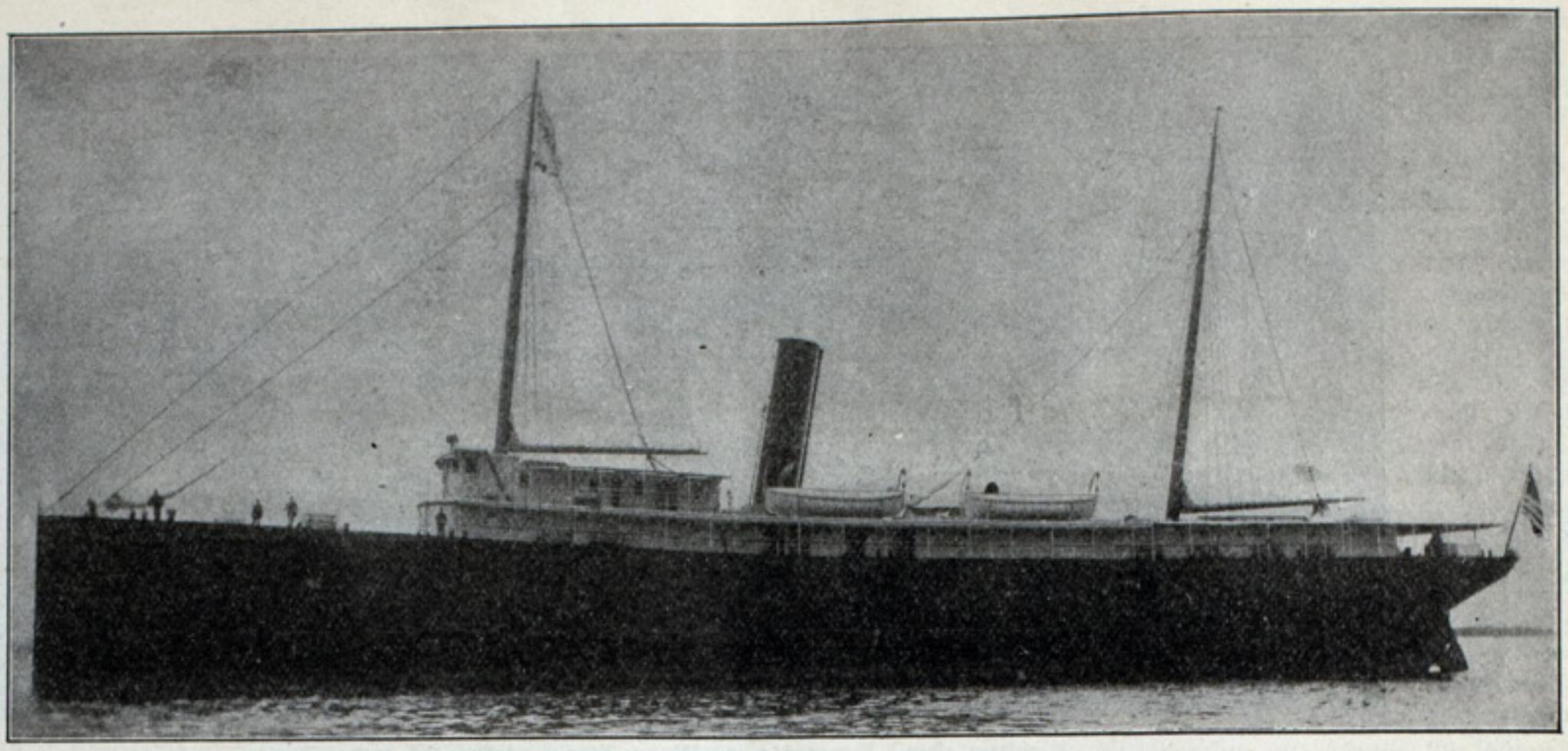


Morro Castle, 1900. Off-Shore Service. 6,004 Tons.

By way of comparison with the fluctuations of the coasting steamer traffic, the following table is appended, showing the arrivals at the port of New York of all classes of sailing vessels during a single week of March in each of the decade years chosen. No division between transatlantic and coastwise vessels has been attempted as the figures were sufficiently eloquent without manipulation, and show the remarkable way in which, in recent years, the steamers of



James S. Whitney, 1900.. Metropolitan Line. 2,707 Tons.



Grecian, 1900. Boston and Philadelphia S. S. Co. 2,827 Tons.

large capacity have competed with sailing freights.

*Sailing vessels Arrived at New York, Single Week in March.**

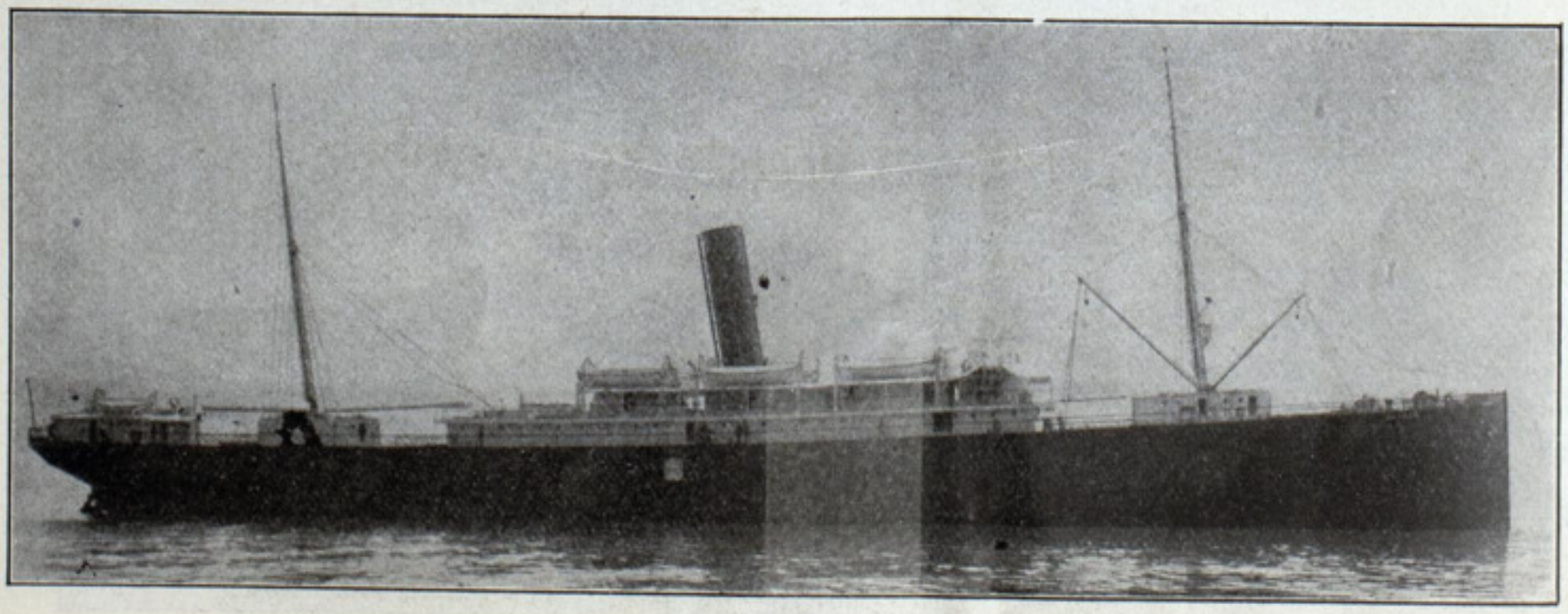
	1842	1852	1862	1872	1882	1892	1902
Ships	15	46	33	15	9	19	1
Barks and barkentines	0	28	5	43	51	29	4
Brigs and brigantines	2	41	5	45	20	11	1
Schooners	5	189	32	169	324	291	47
	22	304	75	272	404	350	53

*There is often considerable difference between different weeks in the same month, owing to the wind, special charters, etc. Therefore in each case, a representative week, as far as possible, has been selected.

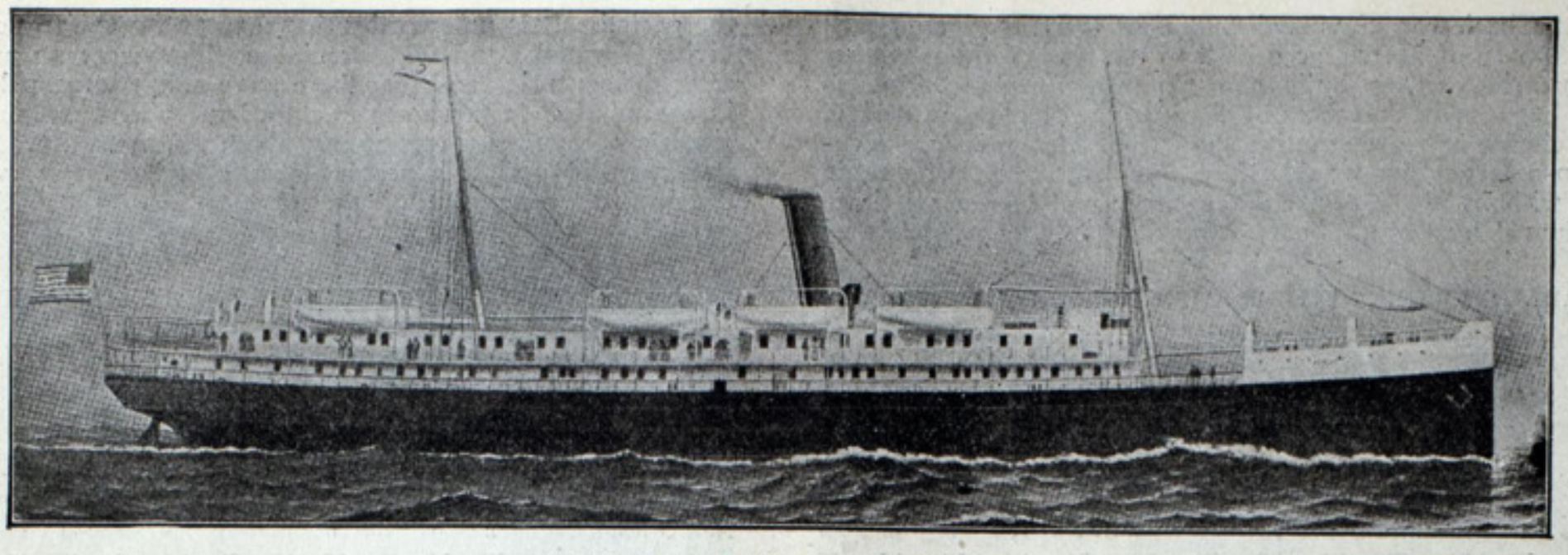
Among the illustrations will be noticed, besides the New York coastwise steamers, several off-shore boats—among them the Morro Castle and Niagara, of the Ward line—and two boats which do not touch at New York, the Kershaw, of the Merchants' & Miners' Transportation Co., and the Grecian, of the Boston & Philadelphia line. The history of the off-shore boats, especially, is of great interest, as in the case of the lines to the Isthmus referred to in 1852 decade, and of the ships to Cuba. The Ward line, which absorbed the old Alexander line among others, and now maintains a fast freight service between New York and Havana, operates the best steamers of the general coastwise type which leave New York, and the Morro Castle, the largest ship on the line, built at Cramps in 1900, as a twin screw steel vessel of 6,004 tons, 400 ft. long, and of 50 ft. beam. It is interesting to contrast her with the old Morro Castle, which had the same run, 38 years ago. The Niagara is one of the original four steamers with• whch the present service was inaugurated, and is also shown

El Valle, 1901. Morgan Line. 4,605 Tons.

for purposes of comparison. She is a single screw, iron boat, of 2,265 tons gross, and 275 ft. long, and was built at Chester in 1877. The Merchants' & Miners' Transportation Co., represented by the Kershaw, is one of the lines not touching at New York which deserves special attention, since it has for many years maintained a freight and passenger service between Boston, Providence, Norfolk and Savannah. Ships



Denver, 1901. Mallory Line. 4,549 Tons.



Apache, 1901. Clyde Line. 3,378 Tons.

were also run between Baltimore and New York, outside in the eighties. The Kershaw is a single screw steel steamer of 2,600 tons, built in 1899 at the Harlan & Hollingsworth yard in Wilmington. The Boston & Philadelphia Steamship Co. have six ships in commission, of which the largest is the Grecian, of 2,827 tons, built also at Harlan & Hollingsworth's in 1900. The Grecian is a steel boat 265 ft. long, and is equipped with triple-expansion engines.

It is a rather odd fact that the singularly unsuccessful City of Savannah, formerly La Grande Duchesse, is the only twin screw coasting steamer out of New York which runs to another American port on the Atlantic. Our coastwise construction has been rather backward in this respect, owing more perhaps to a general spirit of conservatism than to any specific reason or reasons, as the builders, in general, have none to allege accept that the familiar single screw type seems to fulfill the demands of the coastwise service, but it is probable that the next decade will show a radical change in this respect, as there are indications of orders for twin screw coasters in the near future. At present, however, the orders for new ships are rather inactive, although the Delaware River Ship & Engine Building Co. is to build at once a sister ship to the City of Memphis for the Savannah line, and a new boat about the size of the Denver for the Mallory line.

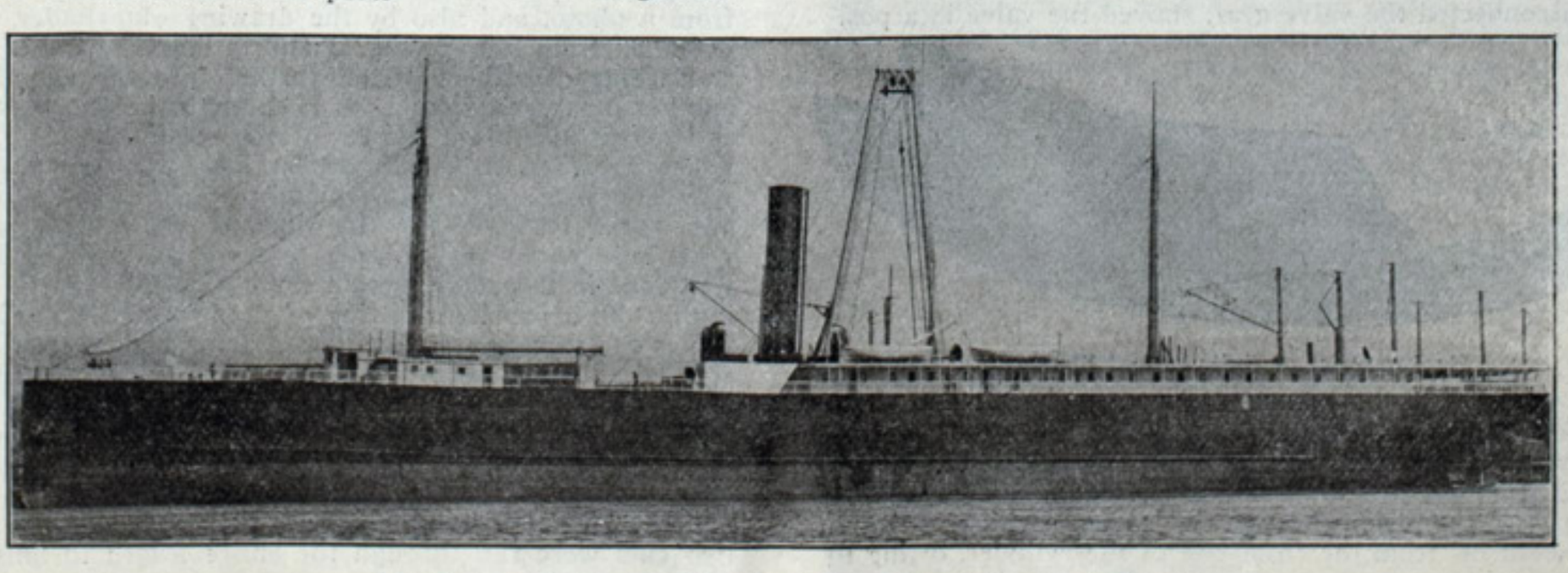
The numerous interesting features of the different lines of the present day must be left chiefly to the imagination of the reader to supply from the tables as lack of space renders it impossible to enumerate them. Attention, however, may be called to the successful passenger business the old Dominion line has built up between New York and Old Point Comfort and Norfolk, and to the large scope of the Clyde line which, at one time or another, has operated services to a great number of southern ports and maintained a large auxiliary fleet of inland and river boats, besides its deep-water services.

The concluding table which classifies the ships in commission to the ports

March, 1902.

	Steamers cleared from New York during March.	Type	Gross tons.	Total gross tons cleared during March.	No. of departures from New York.
NEW YORK & PORTLAND, ME.:					
Maine S. S. Co	North Star	Iron, scw.	3,200	28,044	10
	Horatio Hall	Iron, scw.	3,168		
	Manhattan	Wood, scw.	1,892		
NEW YORK AND BOSTON:					
Metropolitan Line	J. S. Whitney	Steel, scw.	2,707	53,330	20
	H. F. Dimock	Iron, scw.	2,626		
	Herman Winter	Iron, scw.	2,626		
	H. M. Whitney	Iron, scw.	2,707		
Ocean S. S. Co., of Savannah	City of Macon	Iron, scw.	2,100	10,500	5
Joy Line	Old Dominion	Iron, p.w.	2,223	11,115	5
NEW YORK AND BALTIMORE:					
N. Y. & Balto. Trans. Co.	Manna Hata	Steel, scw.	1,103	12,282	13
	Shesapeake	Steel, scw.	1,101		
	Bluefields	Iron, scw.	736		
	City of Philadelphia	Wood, scw.	543		
NEW YORK AND NORFOLK:					
Old Dominion	Hamilton	Iron, scw.	3,128	83,026	30
	Jefferson	Iron, scw.	3,127		
	Princess Anne	Iron, scw.	3,079		
	Jamestown	Iron, scw.	2,898		
	Guyandotte	Iron, scw.	2,351		
	Richmond	Iron, scw.	1,438		
NEW YORK & WILMINGTON, N. C., AND GEORGETOWN, S. C.:					
Clyde	Oneida	Steel, scw.	1,323	7,667	5
NEW YORK AND CHARLESTON AND JACKSONVILLE:	George W. Clyde	Iron, scw.	1,849		
Clyde Line	Arapahoe	Steel, scw.	3,378	36,082	11
	Apache	Steel, scw.	3,378		
	Comanche	Iron, scw.	*3,856		
	Iroquois	Iron, scw.	*3,601		
NEW YORK AND SAVANNAH:					
Ocean S. S. Co.	City of Savannah	Ir., tw-scw.	5,018	53,222	16
	Kansas City	Iron, scw.	3,679		
	City of Birmingham	Iron, scw.	3,066		
	City of Augusta	Iron, scw.	2,870		
	Chattahoochee	Iron, scw.	2,680		
	Nacoochee	Iron, scw.	2,676		
NEW YORK AND TAMPA AND PENSACOLA:					
Atlantic & Gulf S. S. Co	Winifred	Steel, scw.	2,456	2,456	1
NEW YORK AND BRUNSWICK:					
Mallory Line	San Marcos	Iron, scw.	2,839	11,188	4
	Colorado	Iron, scw.	2,765		
NEW YORK AND NEW ORLEANS:					
Morgan Line	El Valle	Steel, scw.	4,605	56,613	14
	El Rio	Steel, scw.	4,604		
	El Siglo	Steel, scw.	4,605		
	El Alba	Steel, scw.	4,605		
	El Norte	Steel, scw.	4,605		
	El Sud	Steel, scw.	4,572		
	El Dorado	Iron, scw.	3,531		
	El Cid	Steel, scw.	4,608		
	El Dia	Steel, scw.	4,605		
	El Paso	Iron, scw.	3,531		
Cromwell Line	Comus	Steel, scw.	4,828	22,177	5
	Proteus	Steel, scw.	4,836		
	Louisiana	Iron, scw.	2,849		
NEW YORK AND GALVESTON:					
Mallory Line	Denver	Steel, scw.	4,549	30,099	9
	Concho	Iron, scw.	3,724		
	Alamo	Iron, scw.	2,943		
	Sabine	Iron, scw.	3,328		
	Nueces	Iron, scw.	3,367		
	Comal	Iron, scw.	2,935		
	Lampasas	Iron, scw.	2,943		

*Lengthened.



City of Memphis, 1902. Ocean S. S. Co. of Savannah. 5,252 Tons.

of Norfolk, Charleston, Savannah and New Orleans, during each successive month of March, according to the type of their engines and the material of their hulls, show in brief form the progress which has been made, and fixes by decades the changes in design. The ports chosen as representative show these changes more accurately than a larger list would, since their trade has progressed normally, without any especial fluctuations, and has at all times been conducted by "good" boats, according to the standards of the period. It is noteworthy that, except for the tenaciously surviving Wyanoke and Old Dominion, there were no paddle boats after the seventies, and that there were only two propellers before in commission to the ports in question. Wood and iron, as hull materials, changed places at just about the same time. Steel does not come in until the present decade and twin screws are evidently to be reserved until the next.

TABLE SHOWING NUMBER OF SHIPS IN COMMISSION TO FOUR PORTS, CLASSIFIED ACCORDING TO ENGINES AND HULLS.

	March 1852		March 1862		March 1872		March 1882		March 1892		March 1902	
	Scw	P.w.	Scw	P.w.	Scw	P.w.	Scw	P.w.	Scw	P.w.	Scw	P.w.
Norfolk	2	1	0	0	2	3	3	2	5	2	6	0
Charleston	0	4	0	0	0	6	5	0	5	0	4	0
Savannah	0	2	0	0	5	3	5	0	6	0	6*	0
New Orleans	0	3	0	0	12	1	6	0	10	0	13	0
Total four ports	2	10	0	0	19	13	19	2	26	2	29	0

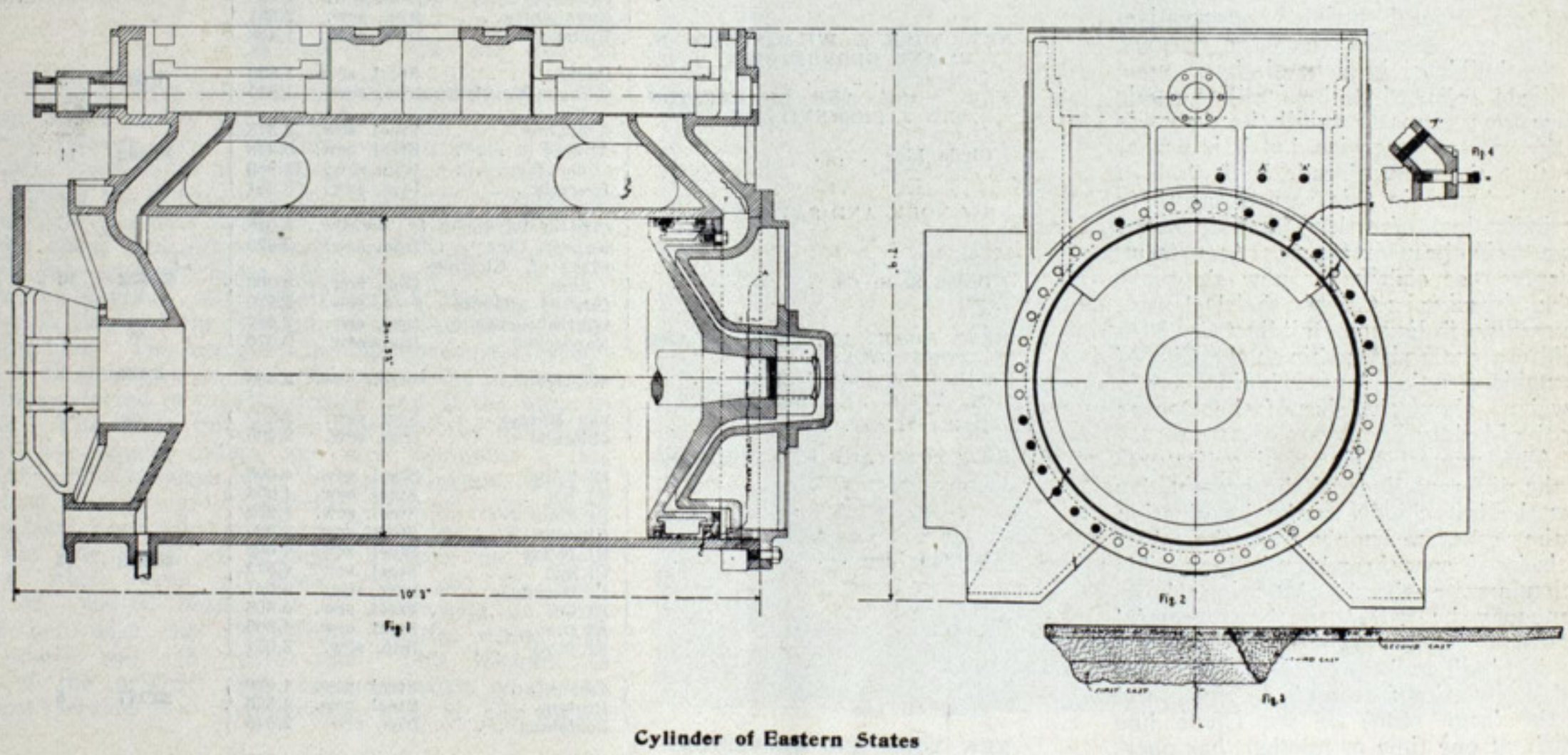
*One twin screw included

	March 1852		March 1862		March 1872		March 1882		March 1892		March 1902		
	Wood	Iron	Wood	Iron	Wood	Iron	Wood	Iron	Wood	Iron	Wood	Iron	Steel
Norfolk	3	0	0	0	4	1	0	5	1	6	0	6	0
Charleston	4	0	0	0	3	3	5	0	1	4	0	2	2
Savannah	2	0	0	0	8	0	0	5	0	6	0	6	0
New Orleans	3	0	0	0	10	3	0	6	0	10	0	3	10
Total four ports.	12	0	0	0	25	7	5	16	2	26	0	17	12

NEWS OF THE GREAT LAKES.

BROKEN CYLINDER OF THE EASTERN STATES.

On the night of July 11 when about three hours' run out of Buffalo, the high pressure engine of the side-wheel steamer Eastern States, owned by the Detroit & Buffalo Steamboat Co., was disabled by the breaking of the follower bolts, follower and the packing rings which jammed in the cylinder, knocking off and breaking the back head casting, the piston, and breaking the flange off the cylinder for a distance of about 7 ft., measuring around the circumference. The piston rod was bent short close to the piston. The engine of the Eastern States is of the three-cylinder, inclined, compound type with diameter of high pressure cylinder 52 in., and of low pressure cylinder 72 in., each with 7ft. stroke of pistons. The boilers are worked at 140 lbs pressure and develop a horse power of 4,000 with thirty-one revolutions. As soon as the accident occurred Mr. J. P. Wells, the chief engineer, disconnected the valve gear, shoved the valve in a position to cover part at broken end of cylinder; the open cylinder end was covered with canvas on which water was played through hose leading from the fire pump which effectually condensed any steam that passed the piston through the broken packing. Steam could not be cut off from the front end of the cylinder, owing to clearance of exhaust edges of valves. In this condition the steamer was run by the two low pressure engines to Detroit, distance 200 miles, making about 11 miles per hour with steam pressure about atmosphere.



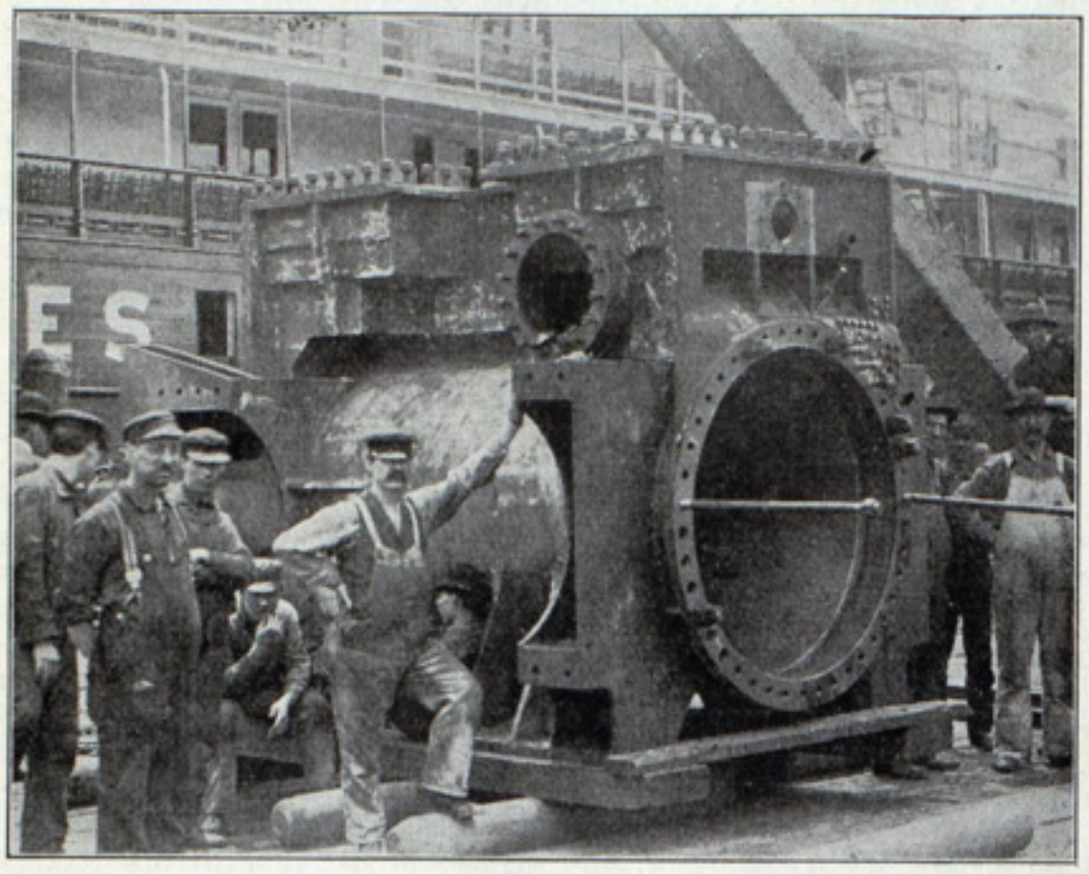
Cylinder of Eastern States

Broken Piece of Cylinder and Flange.

Reaching Detroit the question of repairs was immediately taken up by Mr. Frank E. Kirby, consulting engineer and designer of the steamer. It was a question of a new cylinder, requiring six or eight weeks' time in the best part of the steamer season, or repairing the broken one. After considering several plans Mr. Kirby decided to repair the cylinder on the plan known to founders as the "burning process," which was suggested by Mr. William G. Henderson, foreman of the machine shop of the Detroit Shipbuilding Co., and skillfully executed by Mr. Robert Smith, foreman of the company's foundry. The flange and part of cylinder broken off is clearly shown by the illustration from a photo, and also by the drawing of cylinder. The break extended from A to B Fig. 2, and in depth to C Fig. 1; a small crack extended about 10 in. further into the cylinder from C, another crack run from D to E through the flange into the port, and across the lower corner of the steam chest. The cylinder, which weighed in rough 28,800 lbs., was removed from the steamer, taken to the foundry and placed in a pit, broken end up, and about 12 in. above the working floor. Dry sand moulds were built about the cylinder to form the flange. The burning was done in three castings on three successive days. The hatching on the expansion drawing of the broken piece, Fig. 3, clearly shows the part done at each cast. This plan greatly reduced the risk of a break from contraction. Fusion at the line of break required from eight to ten minutes and the casting completed in seventeen to twenty minutes. Though the broken piece weighed only 340 lbs., about six tons of metal was used in the operation of burning.

After roughing out the burnt part of the cylinder in a lathe, two cuts were run through the entire length to finish the bore.

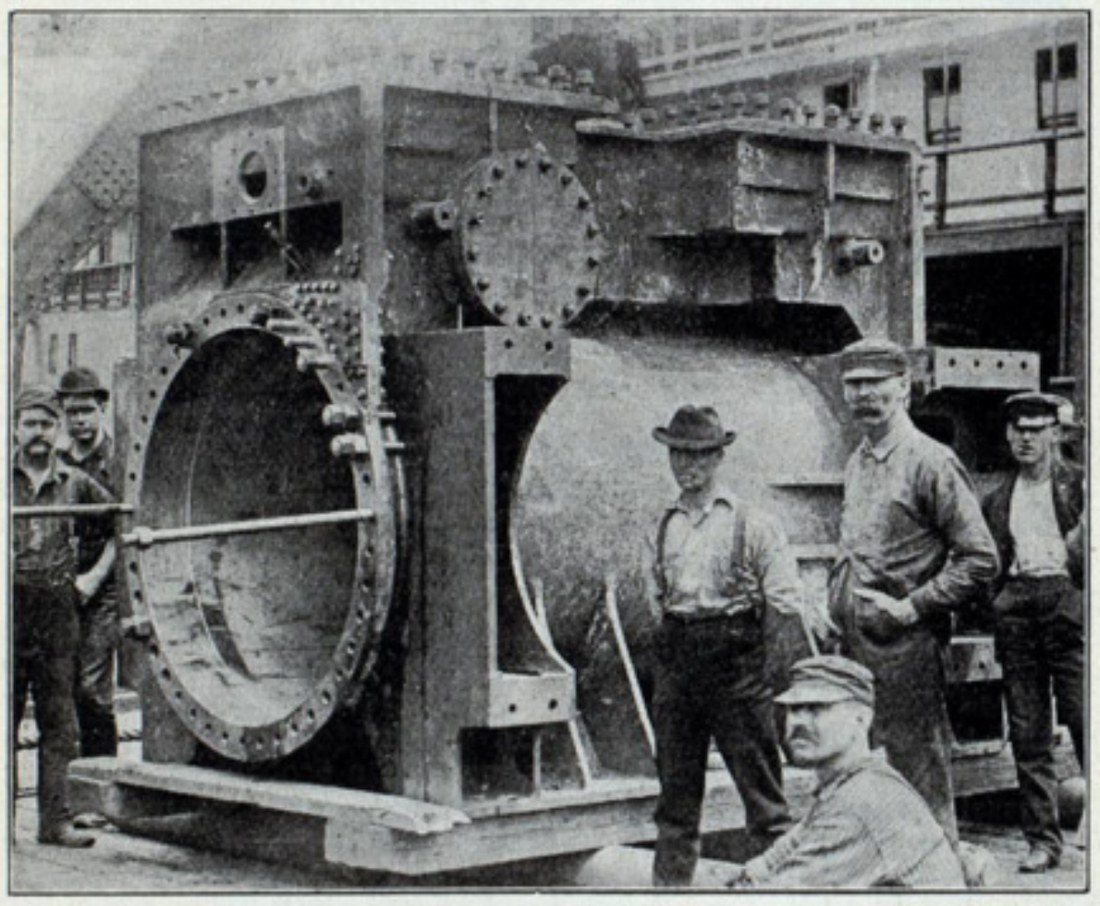
A plate was tap-bolted over the small crack in bottom. The creak D E was repaired by brass plates, tap and through-bolted which show in the photo prints. The stress being relieved by collar



Repaired Cylinder ready to be hoisted into the steamer.

bolts and screw stays as shown at H and A, Figs. 3 and 4. The cross hatching show where collar bolts are fitted in the flange. While the cylinder was being repaired in the manner described, new cylinder head, piston rod, packing, follower, etc., were made and fitted. There was a slight set in the steel piston which was removed by reboring and returning.

On the fourteenth day after the commencement of the job the repairs were completed, a dock-trial made of the engine and the steamer was ready for service, but, owing to its being her day



Another view of the repaired Cylinder.

for leaving Detroit she did not go into service until the following day when a trial run was made at full boiler pressure. All joints were found to be tight, everything worked perfectly and she has since made her runs regularly. Great credit is due Mr. William England and Mr. James Hunter for the rapidity with which they disconnected the engine, removed the cylinder to the shop, and replaced it in the steamer after repairs and connected engine ready for service.

WHAT IS CLAIMED IN THE COLLISION CASES.

Three disastrous collisions have occurred so for on the great lakes this season, each resulting in a total loss of one of the vessels, attended in two instances with loss of life. It is interesting to note what the lawyers on both sides are claiming in the court proceedings.

The George G. Hadley and the steamer Thomas Wilson collided off Duluth on June 7 in broad daylight. The Wilson was sunk and nine of her crew drowned. The Hadley was also badly damaged. The City of Venice and the Canadian steamer Seguin collided in the middle of Lake Erie on Aug. 5 on a perfectly clear and calm night. The City of Venice was sunk and three of her crew drowned or killed in the wreckage. The steamers Fred Pabst and the Henry J. Johnson in a heavy fog came together a few miles below Nine-Mile point, Lake Huron, resulting in a total loss of the Johnson. No pleadings have been filed or hearings had as to the latter collision, and a statement of the facts as definitely claimed by the parties is, therefore, not accessible.

In the Hadley-Wilson colllsion it is claimed for the Hadley that as she was proceeding into Duluth and heading for the piers, she received orders changing her destination to Superior, whereupon she starboarded and blew two blasts to the Wilson, out-bound; that as the Wilson did not answer or give any signal but herself began to swing to starboard, the Hadley stopped and backed strong, but that the Wilson continued at full speed swinging to starboard, and before the way of the Hadley could be overcome the vessels came together, the Hadley striking nearly at right angles, resulting in the singing of the Wilson and in badly damaging the Hadley. The collision occurred some distance outside of the piers and perhaps a thousand feet southerly.

For the Wilson it is claimed that as they left the piers they made the Hadley coming in, but her course was so far northerly of the Wilson's that a passing signal was not blown to her; that the vessels continued and were about to pass safely port to port when the Hadley swung or sheered sharply to port toward the course of the Wilson; that thereupon the Wilson's wheel was put hard aport and her speed continued as the only way to avoid collision, which, however, resulted as stated. Proceedings for limitation of liability were instituted at Duluth by the owners of the Hadley, in which she with her pending freight were appraised for about $24,000, for which bond was given.

In the Seguin-City of Venice collision it is claimed for the City of Venice that they were proceeding from the Southeast shoal on the Buffalo course when they made the Seguin, upbound, on an opposite parallel course, well on their starboard hand; that at a considerable distance away the Seguin's red light closed and the steamers were about to pass starboard to starboard without risk of collision when the Seguin began to swing to starboard, whereupon the Venice sounded a signal of two blasts, but as the Seguin continued to swing, the Venice reversed and backed strong, also sounding an alarm signal; that the Seguin continued apparently at full speed and crushed into the starboard side of the City of Venice, so damaging her that she sank in a very few minutes.

For the Seguin it is claimed that they were on their regular course from Long point to Southeast shoal when they made the lights of the City of Venice ahead and a long distance off, seeing both green and red; that the Seguin's course was altered to starboard until these lights bore somewhat on her port bow, and the courses of the vessels were such that they would pass a safe distance port to port; that as they approached, the helm of the Seguin was slightly ported and they were about to pass without risk of collision when the Venice blew a passing signal of two blasts and began to swing to port and toward the Seguin; that the Seguin promptly starboard, reversed and backed strong, but the steamers were so close together that it was impossible to avoid collision.

For both vessels it is claimed that the night was clear; they saw the lights of the other a long distance off. Each claims that from a condition of entire safety risk of collision and collision were produced by the wrongful act of the other; the City of Venice claiming that the Seguin ported into her from a safe position on the Venice's starboard bow, the Seguin claiming that the Venice starboarded into her from a safe position on the Seguin's port bow. The Seguin was libeled at Cleveland for $114,101.32; limited liability proceedings were instituted and her value fixed at $51,200.

DEVIATION TARGETS.

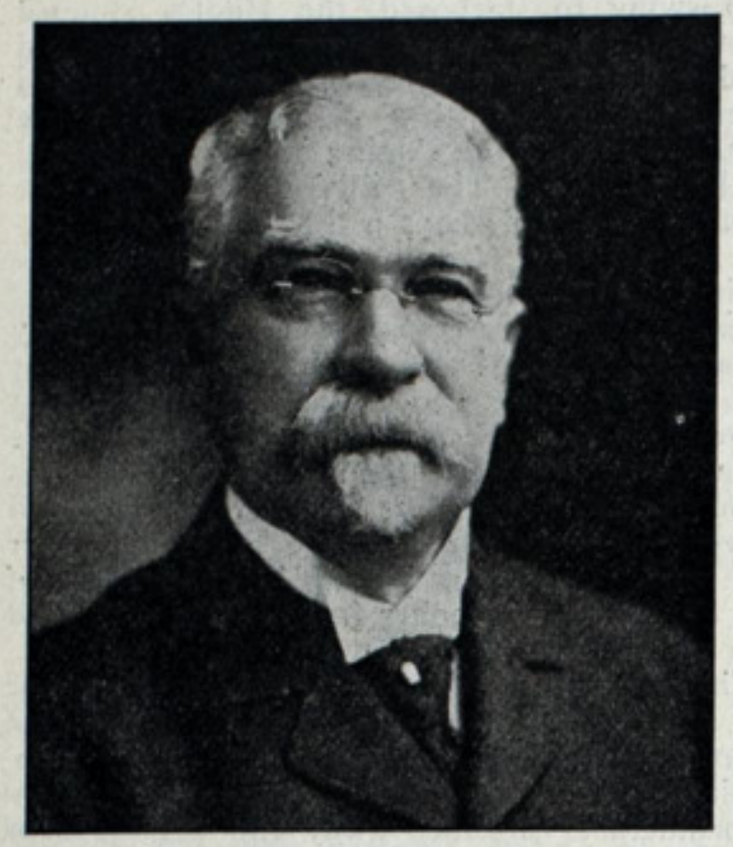
While in Canada last week President Livingstone and Treasurer McKay of the Lake Carriers' Association became very much interested in targets that have been set up by the Canadian government for the purpose of permitting vessel masters to test their compasses. Capt. McKay has brought the matter to the attention of the hydrographer of the navy through Mr. A. Dovale, nautical expert in charge of the Cleveland branch hydrographic office. It is proposed that the targets be located at two points on the lakes-Straits of Mackinaw and Sault river. The necessity for two sets is that some vessels seldom go to the Sault and others seldom go to Lake Michigan. There does not seem to be any good location south of these points where all vessels could be accommodated.

The idea, as Mr. Dovale explains it to the hydrographer, is to have the targets placed on the magnetic meridian, so that ships may be headed on the different courses and the duration taken at once. The targets could consist of poles, each set with its corresponding ones in the opposite quadrant, to be painted or marked alike. They might be painted white with rings at different heights. Where the shore is too far off the targets on that point could be left out, provided a stern range could be taken.

Owing to the fact that Azimuths are not generally used on the lakes, on account of not being understood, and because ships are often in port or in a river at the most convenient time for observations, and on account of the different iron ore, coal and other cargoes carried, it is thought that a vessel could in passing take her deviation on the courses required for the particular cargo she might have on board, and for which her compasses had not been corrected before.

DEATH OF SENATOR JAMES McMILLAN.

Vessel interests of the great lakes were shocked to learn of the sudden and untimely death of United States Senator James McMillan, at his country home, Manchester-by-the-Sea, on Sunday morning. In the Senate Mr. McMillan was a staunch advocate of shipping interests, and the position he occupied in that body was one of great influence as regards lake shipping, and in fact marine affairs of the entire country. Appropriate resolutions were adopted at a special meeting of the Lake Carriers' Association held in Cleveland Tuesday.



The Late Senator James McMillan.

Death was due to heart failure and congestion of the lungs. Senator McMillan was in good health up to Saturday afternoon. While playing golf on the Essex county club grounds he was overcome by faintness, but rallied upon taking a stimulant. He felt much better at night and was especially well at the dinner hour. Towards midnight he was seized again, but responded to tonics. The third attack, about 3 o'clock in the morning, carried him off, the heart making no response to the most powerful drugs. Mrs. McMillan and his daughter, Amy, were present at his bedside. Mr. McMillan was born a Canadian of Scotch blood at Hamilton, Ont., on May 12, 1838. His father was a Presbyterian elder whose rigid rectitude, thrift and enterprise made him influential and prosperous in Hamilton where he had settled two years before his son James's birth. Future senator's boyhood was not different from that of the ordinary boy of his time. Finishing his school education, which came to an end at the time of his graduation from the Hamilton grammar school, he became a clerk in a hardware store. Four years were devoted to learning the business, and at seventeen he might have begun a career as a business man in Canada which few young men would have let slip. About this time, however, he was fascinated by the apparently golden opportunities to be had in the United States, and in 1855 he went to Detroit with letters to some of the most prominent business men in that city. He was engaged as a clerk in a wholesale hardware house at the outset, but the panic of 1857 compelled the firm to discharge all but the oldest of its employees. McMillan was among those who suffered loss of employment. His father, who soon after settling in Hamilton, became a bank director, and was later appointed to a responsible position as purchasing agent for the Great Western railway, now came forward in his son's interest. His influence secured for the future senator a position with the Detroit & Milwaukee railroad as purchasing agent. While acting in that capacity he became acquainted with Samuel C. Ridley, railroad contractor, who had contracted to build the road from Lowell to Grand Haven, and also docks at the latter place and Detroit, and entered his service. McMillan's duties were to hire men, purchase sppplies and attend to the financial part of the business. During the progress of the work the men went on a strike, and although under twenty years of age he undertook to pacify them. He succeeded. After two years in this position a flattering offer to go with Ridley to Spain to build railroads in that country was refused, and 1861 saw him back in his old position with the Detroit & Milwaukee.

His career thus far had attracted considerable attention from business men. He had saved his money and invested his first $100 in a mortgage which he was compelled to foreclose. The sale realized $100, but the lawyer charged $50, which was a decided setback. Other real estate deals were more successful, and he accumulated the money wherewith to launch out for himself. In the 60's he entered into the business of building freight cars. From small beginnings the manufacture of cars grew to be the largest industry in Detroit, the great Michigan-Peninsular Car Co., capitalized at $10,000,000. To this interest Mr. McMillan added the Detroit & Cleveland Navigation Co., several lake transportation companies, the building of the international bridge at Sault Ste. Marie, and of the Duluth, South Shore & Atlantic railway across the upper Michigan peninsula; and various other enterprises. During this time Mr. McMillan invested heavily in many of the leading manufacturing and financial institutions in the city of Detroit. For forty years Mr. McMillan had been the most vigorous personal force in the business affairs of Detroit. The commercial institutions of various kinds in which he was interested and which he assisted in developing have been important industrial agencies in advancing the business interests of the city, and at the same time their profits built him a substantial and ever-increasing fortune.

Mr. McMillan became interested in politics in the early seventies, when he was connected with the city government of Detroit. During the great greenback campaign of 1878 he was a member of the Republican state central committee of Michigan, and in 1879 he succeeded Zachariah Chandler as chairman. To this honorable position he was several times re-elected, being generally recognized as the Republican leader of his state. In 1889 he was elected senator, succeeding Thomas W. Palmer, and he has since been honored by two re-elections to this body. In these elections Mr. McMillan enjoyed the rare distinction of being three times nominated unanimously by acclamation, and once being elected by unanimous vote, when in 1895 the Democratic member of the Legislature cast his vote for him. His third term began last March, and he was the seventh Republican senator in point of service in that body. Mr. McMillan was at once recognized in the senate as a man of wide experience in business, and was placed on several important committees, among them District of Columbia, agriculture, postoffice and post roads, and was made a chairman of the committee on manufactures. By the retirement of Senator Ingalls, of Kansas, he became chairman of the District of Columbia committee. The position is similar to that of mayor of a city, and to his efforts are due many municipal improvements at the capital. All these honors came to the Michigan senior senator during his first term. His subsequent career in that body added to the respect vouchsafed him as a man and a legislator, and he was at the time of his death a member of the committees on Commerce, on naval affairs and on relations with Cuba. While his foreign birth made aspiration to the presidency impossible for him and his friends, he was mentioned, in 1898, as a fitting successor to Secretary Hay as ambassador to the Court of St. James, a position which finally went to Joseph H. Choate, of New York.

In 1860, when Mr. McMillan's salary was only $60 per month he married Miss Mary Wetmore, whose brothers were leading china merchants in Detroit. She bore him seven children, of whom four survive, William C. and Philip, of Detroit, Frank of New York, and a daughter Amy. Mrs. McMillan also survives him. The McMillan family have suffered severe loss by death in the past year. Senator McMillan's son, James H. McMillan, and his grandson, James H. McMillan, Jr., died in Colorado within a few months of each other last winter. The senator's brother, William McMillan, and his nephew, Maurice McMillan, have recently died.

SEEKING NAVIGATION AIDS FROM CANADA.

President Wm. Livingstone and Treasurer Geo. McKay of the Lake Carriers' Association spent several days in Canada recently in consultation, on the subject of aids to navigation, with the deputy minister of marine and fisheries and with the chief engineer (Col. Anderson) of the marine department, as well as leading vessel owners of Toronto, Hamilton and other places. Minister of Marine Sutherland was not in Ottawa when the officials of the Lake Carriers' Association called but he has since written them regarding suggestions made to the department. He says that range lights will be established as soon as possible at Point Edward. Private ranges were maintained at Point Edward for a long time by the Lake Carriers and the re-establishment of them will undoubtedly be welcome news to the vessel masters. It is more than probable also that the vessel owners will be relieved of the expense of maintaining lights at Point aux Pins. Improved illuminating apparatus is now being installed in the main lighthouse at Point aux Pins.

The Canadian government was also asked to establish gas buoys on the east side of the new dredged channel past Stag island, St. Clair river. This is the channel to the westward of Stag island, which when lighted so that it will be used, will give two channels in this vicinity. It has been dredged out 1,000 ft. wide, with all obstructions removed, but the east bank is on the low marshy shore of Stag island, and it is difficult to define without some marks. The Lake Carriers suggest the placing there of three gas buoys, in addition to the platform light which the Canadian government established at the foot of the island two years ago. The attention of the United States authorities, in having the channel to the west of Stag island improved, is to provide two channels at this narrow part of the river, so that boats downward bound can use the channel west of Stag island, and those upward bound can use the channel that is now generally used. Unfortunately the Canadian government has at present, no means of furnishing gas to the buoys. In order to open up the new channel at Stag island an effort will be made to have the United States lighthouse department maintain the buoys if they are furnished by Canada. Canadian vessel owners will endeavor to have their government fit up the Petrel or some vessel of her kind for the care of gas buoys at times when regular duties would not be interfered with.

The Collinwood Ship Building Co., Collinwood, Ont., purposes erecting at once a new boiler and machine shop to measure 80x120 ft. President Long says that the company proposes to make a specialty of marine engines and boilers. A large sum of money will be expended in equipment.

LAKE FREIGHT MATTERS.

Notwithstanding the early opening of navigation and an enormous movement of freight of all kinds throughout the lake region thus far in the season, vessel owners still have reason to expect great activity in the fall and are hesitating about entering into engagements that would prevent them from taking advantages of improved freights. It is understood that two or three blocks of ore to be moved from the head of the lakes are offered for the balance of the season at 80 cents, the old contract rate. This rate does not seem to be attractive, however, as it is evident that for the present, at least, ore shippers are bent upon moving all the ore that the mines, docks and railways can care for. They have probably decided to take no chance against a big grain crop or the possibility of the Ohio and Pennsylvania railroads giving preference during the closing part of the season to coal, in which a shortage of shipments now seems certain. A large fall grain movement is expected, especially from the northwest. A Duluth letter contains the following note on this score:

"As the crop is a late one, it is not probable that grain will arrive in sufficient quantities to have any material effect upon the situation until about the middle of September. Not in years, however, have crop prospects been so flattering. Weather conditions have been ideal and the acreage is larger than usual. Larger increases may be expected in the production of flax and barley. In North Dakota the flax acreage is estimated at 2,100,000 acres as against 1,500,000 acres last year. Advices from Winnipeg are to the effect that Canadian crop conditions are equally favorable."

AROUND THE LAKES.

In six days of last week 181,779 gross tons of ore was received at Conneaut, one of the principle ore ports of Lake Erie.

Mr. B. Crowell, of the firm of Crowell & Peck, Cleveland, is on a three weeks trip examining mining properties in the Lake Superior region.

An excellent chart in colors of Marquette and Presque Isle harbors has just been issued by the government. It may be had at the office of the MARINE REVIEW PUB. Co., or will be mailed if desired.

The steamer V. Swain blew out a cylinder head on Lake Huron on Monday, and broke a connecting rod. She was picked up by the City of Genoa and towed to Detour. The steamer Vulcan towed her to Port Huron for repairs.

A Duluth dispatch says that all records for quick loading of steamboats were broken last week when the steamer James Hoyt received her cargo at the Mesabi dock in two hours. In that brief space of time 5,439 gross tons of ore were shot into her hold.

It is understood that the Detroit Ship Building Co. has been ordered to construct duplicate parts of all the machinery of the vessels of the Detroit & Cleveland and Detroit & Buffalo lines, so as to avoid, in the future, long delays due to the accidents to engines.

Inspector E. H. Green of the eleventh lighthouse district and Capt Lansing H. Beach, lighthouse engineer, have been instructed to prepare a report upon the advisability of using Pintsch gas in several of the St. Mary's river and Lake Superior lighthouses.

At the request of Capt. George P. McKay of the Lake Carriers' Association, Capt. Lansing H. Beach is considering the advisability of changing the Detour light from a fixed to a flash-light in order that it may be more readily identified. Capt. Beach would like to hear from vessel masters on the subject.

John Brown, one of the oldest masters on the lakes, died at his home in Lorain during the past week. He was seventy-six years of age and had sailed nearly all his life. He took the steamer Paraguay to the coast last fall, and of late had been working with the Great Lakes Towing Co.

Another of the Lynn brothers of Port Huron, who are well and favorably known in marine circles throughout the lakes, is to represent a large engineer supply house. M. J. Lynn has just been appointed lake representative of the Crandall Packing Co. He will give his entire attention to the lake trade and will undoubtedly be successful.

The Hon. J. Israel Tarte made an important announcement at Collinwood last week, at which place he stopped for a few hours on his tour of the lakes. He said that the dominion government would create a new office with Mr. Coste in charge to look after transportation on the great lakes. He did not explain what the special duties of the office would be.

It is understood that Folger Bros., who have for several years operated the Thousand Islands & St. Lawrence Navigation Co., have sold their fleet of twelve steamers to the New York Central railway. The railway company promises four new steamers for next year and to establish a steamer service from Lewiston, at the mouth of the Niagara river, to Montreal.

Capt. A. P. Chambers, who was master of the steamer Princeton, has been made shore captain of the Pittsburg Steamship Co., (Steel Corporation fleet). His headquarters will be in the Cleveland office of Capt. W. W. Smith, marine superintendent. A number of changes were made in the masters of the fleet on account of Capt. Chambers' promotion. Capt. M. A. Boyce, who was in the steamer Bessemer, has taken the Princeton; Capt. James A. Walsh, has gone from the Cambria to the Bessemer, Capt. C. E. Copeland, who sailed the Griffin, has taken command of the Cambria and Capt. A. G. Tapan of the barge Maida will sail the Griffin. Walter E. Stover, who was mate of the steamer James J. Hill, was appointed master of the barge Maida.

In an interview at Detroit Mr. C. W. Elphicke, vessel owner of Chicago, speaks very hopefully of conditions on the lakes. He anticipates that there will be an enormous crop of flaxseed, wheat and oats. He says he would have let a contract for another large vessel had it been possible to have obtained the ship for service at the beginning of next season.

After working continuously since September, 1898, the contractors constructing the big water power canal at Sault Ste. Marie have completed their task and within a short time water from Lake Superior will be flowing through the great waterway which is to develop 100,000 H. P. The canal is about 5 miles long and about 25 ft. deep. A three-ft. sluice way will be used in admitting the water, it being desired that the canal be filled slowly.

Gage records of the United States lake survey show the following mean stages of water for July, above mean sea-level: Lake Superior, 602.32 ft.; Lakes Huron and Michigan, 580.34 ft.; Lake Erie, 572.83 ft. These stages show Lake Superior to have been 0.25 ft. lower than during same month last year, and 0.02 ft. lower than in July 1895; Lakes Huron and Michigan were 0.28 ft. lower than during same month last year, and 0.64 ft. higher than in July 1895; Lake Erie was 0.83 ft. higher than during same month last year, and 1.28 ft. higher than in July, 1895.

"Collision Bend" is the name tugmen have given that section of the Chicago river lying between Sixteenth and Twelfth streets. The stretch of water between the bridges crossing at those streets was productive of four accidents one day last week, in which four steamboats figured. Three schooners suffered from the blows of the steamers though none were so seriously hit as to cause much delay in port. The Charley Crawford suffered the most injury when hit by the Western Transit liner Syracuse. The George Sturges and Resumption were hit by the Anchor line Susquehanna and the W. J. Averill of the Rutland line.

A Duluth dispatch says that it depends upon Capt. Michael Fitzgerald himself whether he wishes to sail the lakes in command of a vessel again. After the collision between the steamers Hadley and Wilson his license was revoked. If Capt. Fitzgerald passes another examination as all masters and pilots are required to do every five years, he will be given another certificate. Under the present law governing navigation on the great lakes, a five-year license is given the masters and pilots. Formerly the license was of one year duration. It is not known what the captain's intentions are, whether he will now retire from active service on the lakes and enjoy the competence he is said to have laid by in the many years of past service, or whether he will secure another license and spend a few more of the remaining years of his life on the waters that have been his home. From the fact that Capt. Fitzgerald made an effort to have the supervising inspector reverse the findings of the local office, the impression prevails that he will take the examination for another license and that if he secures one it will not be such a difficult matter for him to secure another boat, the last accident being the only one of any importance that stands against him in nearly a half century of sailing on the lakes.

UNITED STATES SHIP BUILDING CO.

The Trust Co. of the Republic has completed payments for the plants which are to be embraced in the new United States Ship Building Co. The list of plants embraces the Bethlehem Steel Co., South Bethlehem, Pa.; the Union Iron Works, San Francisco Cal.; Bath Iron Works and Hyde Windlass Co., Bath, Me.; Eastern Ship Building Co., New London, Conn.; Harlan & Hollingsworth Co., Wilmington, Del.; Crescent Ship Yard, Elizabeth, N. J.; Samuel L. Moore & Son Co., Elizabeth, N. J.; and the Canda Manufacturing Co., Carteret, N. J. The company expects to economize by classifying its work, that is by keeping each ship yard busy upon a special type of work instead of upon several types as at present. The basis upon which each company enters the combination has not as yet been given out.

SALE OF THE REPUBLIC MINE.

As foreshadowed in the last issue of the REVIEW, the Cambria Steel Co. has secured control of the Republic Iron Co., which operates the Republic mine on the Marquette range, and the steamers Republic and Continental and the schooner Grace Holland. Sixty thousand shares have been transferred to the Cambria Steel Co. for $900,000, which is $15 a share. The steel company will assume the remaining 40,000 shares at the same figure if they are transferred within the next ninety days. Mr. W. D. Rees, president and treasurer of the Republic Iron Co., and Mr. W. B. Castle, secretary, have both resigned. In their places Mr. Powell Stackhouse of Philadelphia has been chosen president and Mr. A. P. Robinson, of Philadelphia, secretary and treasurer. By request Mr. Rees will remain a director and a member of the executive board. Present offices of the company will be maintained for the balance of the year under the direction of Mr. Castle.

TRADE NOTES.

Contracts for the new works of the Cleveland Pneumatic Tool Co. have been awarded to Messrs. J. A. Reaugh & Son of Cleveland. It is expected to have the new works completed and ready for operation within ninety days. Machinery equipment will be modern in all respects.

The arc lighting apparatus for the Fort Wayne Electric Works, Fort Wayne, Ind., has for many years been recognized as embodying only the best elements of design and construction, as is attested by the many installations of series arc lighting systems in this country using the "Wood" arc dynamos of different sizes and "Wood" open and enclosed arc lamps of various types. Improvements in design and details of construction of arc lamps have been made as circumstances dictated. Bulletin No. 1026 tells all about it.

The Peerless Rubber Mfg. Co., 16 Warren street, New York, has issued a lithograph as an advertisement of its "Rainbow Packing" which is about as striking a thing as could possibly be contrived. The lithograph presents a view of the harbor and North river, New York city with the majestic skyscrapers in the background. In the center is a picture of the Oceanic and in the direct foreground the tug Peerless is towing a scow loaded with Rainbow packing, various makes of hose and belting of several kinds. Over the picture, and across the entire heavens in fact, is a rainbow in its complete colors bearing the words, "Rainbow Packing" in red. The whole thing is as striking as a conflagration. The company, as the advertisement announces, also makes steam hose, air brake hose, perfected hose, fire hose, garden hose, brewers hose, belting, packings, valves, gaskets, discs, matting and tiling.

CHICAGO PNEUMATIC TOOL CO. IN SCOTLAND.

The exhibition of ship riveting which the Chicago Pneumatic Tool Co. is making in Glasgow, Scotland, is proving highly successful. The work there is in charge of Mr. E. Grennell, for many years superintendent of the Chicago Ship Building Co.'s works at South Chicago, and he reports most favorable progress and great interest on the part of the ship builders on the Clyde. To further assist him in the work, the Chicago Pneumatic Tool Co. has sent two expert riveters from the Chicago ship yards to Glasgow. The Chicago company is injecting American methods into its European business, and has recently sent Mr. F. D. Johnson, manager of their New York office, to push business there, and has also sent Mr. George H. Hayes to take charge of the mechanical work in its London works. Mr. W. H. Armstrong, from the headquarters of the Chicago Pneumatic Tool Co. at Chicago, will have charge of the New York office of that company.

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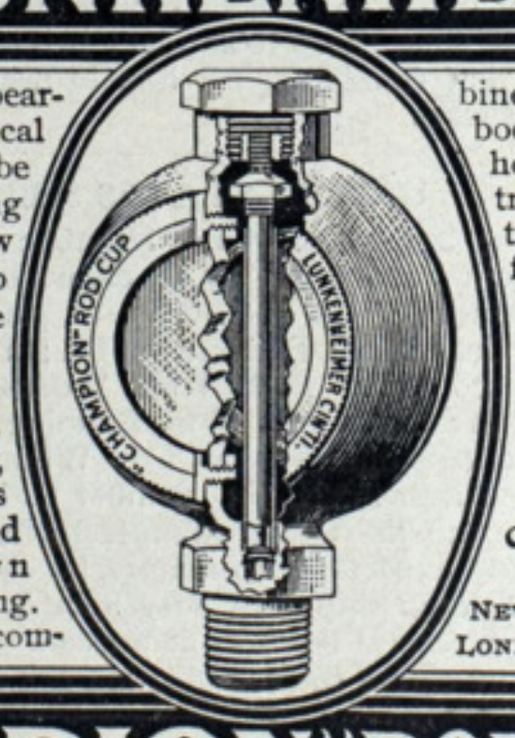

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